



CARLETON UNIVERSITY

UNDERGRADUATE CALENDAR

OTTAWA • CANADA
1990-91



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CARLETON UNIVERSITY

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Forty-Ninth Annual
Undergraduate Calendar
for the Academic Year 1990-91

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This Calendar is published several months in advance of the beginning of the academic year. The University reserves the right to make whatever changes may be required, including alteration of the various fee schedules and cancellation of particular courses.

This is Carleton University



Introducing Carleton

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Carleton University is a university old enough to have an established reputation, yet young enough to combine its tradition with innovation in ways to meet the diverse needs of modern students.

Carleton began in 1942 as a non-sectarian part-time college for the many men and women who came to Ottawa to serve the country's war effort. Since that time, it has grown and matured and now takes its place proudly as one of Canada's leading universities.

The first "campus" was a few rented classrooms in a high school. Full-time programs were offered for the first time in 1945, and Carleton moved to its own building in downtown Ottawa the following year.

Carleton's continued growth led to another move in 1959 to its present site—a picturesque 62-hectare campus, which now has 27 buildings, located between the Rideau River and the historic Rideau Canal. The canal, always popular for boating in the summertime, has gained great wintertime fame in recent years as the world's longest skating rink. One end of that rink is at Carleton's front door; the other end, eight kilometres away, is at the National Arts Centre—a short walk from Parliament Hill.

The Parliament Buildings and the National Arts Centre are just two of the many community resources available to Carleton's students, thanks largely to the University's location in the nation's capital. Museums, art galleries, libraries, embassies and many government departments, national associations and organizations willingly open their doors. The Ottawa area has cultural and recreational facilities to suit every taste, and a large number of information and entertainment programs in both English and French.

Some 19,500 full- and part-time students attend Carleton and study with more than 700 full-time faculty members as well as many part-time instructors.

The Faculties of Arts, Science, Social Sciences, Engineering and the School of Computer Science offer programs in architecture, arts, commerce, computer science, engineering, industrial design, journalism, music, public administration and science that lead to bachelor's degrees. Certificates are offered in public service studies, teaching English as a second language, law enforcement studies, English language and composition, and French language studies, and there is an undergraduate diploma in music. Courses in English as a second language and a variety of other services are available through the Centre for Applied Language Studies.

The Faculty of Graduate Studies and Research offers 34 master's degree programs in arts, business, computer science, engineering, journalism, science and social work, and 14 doctoral degree programs in arts, engineering and science. In public administration there is a graduate diploma.

The academic reputation Carleton has established in these areas is complemented by exciting interdisciplinary programs, among them Canadian studies, computer science, criminology and criminal justice, environmental science, film studies, integrated science studies, international affairs, mass communication, public administration, public policy and management, Soviet and East European studies and women's studies. Courses in several disciplines are devoted to visual and performing arts, labour studies and medieval studies. Similarly, courses in several disciplines are devoted to African, Asian and urban studies.

The School of Continuing Education carries on Carleton's tradition of serving students who wish to study on a part-time basis. A wide range of opportunities exists for those

who wish to qualify for degree studies, to upgrade professional skills or simply to study for the pleasure of it. Free tuition for senior citizens encourages persons 60 years of age or older to work toward degrees or to take credit courses for the joy of learning.

"Challenge for Credit" allows older students admitted to Carleton to receive credit in some undergraduate programs, based on their personal and work experience outside the University.

The School of Continuing Education reaches out to the community by taking courses to the students. Courses and workshops are offered each year at several off-campus locations in the greater Ottawa area. In addition, Carleton's Instructional Television program brings courses to the homes of area residents through cable television.

The focus of learning, as at any university, is its library. The MacOdrum Library houses more than a million volumes and almost a million other items that include an increasing collection of microfilms, archival material, maps, aerial photographs, slides, government documents and prints. Reading rooms housing books and periodicals of specialized interest are maintained by many departments around the campus.

A broad spectrum of recreational, cultural and leisure-time opportunities is open to members of the Carleton community. The multipurpose University Centre has a coffee house, a pub and a games room. The athletics complex provides facilities for physical recreation in a wide range of activities from individual fitness programs to interuniversity team competition in a number of sports. Accommodation for more than 1,700 students is provided in Carleton's six residence buildings. Many individual departments offer lively and varied programs of activities. Special-interest clubs, public lectures, concerts, films, live theatre, conferences and conventions bring added depth and new dimensions to life at Carleton.

This is just a glimpse of Carleton University, its programs and facilities. The University welcomes enquiries and encourages potential students, their parents and the general public to visit the campus. The offices listed below will be happy to answer any specific enquiries.

Admission and Application for Undergraduate Programs

The Office of Admissions and Academic Records
Room 315, Administration Building
Carleton University
Ottawa, Ontario K1S 5B6
(613) 788-3663

Admission and Application for Graduate Programs

Faculty of Graduate Studies and Research
Room 1512, Dunton Tower
Carleton University
Ottawa, Ontario K1S 5B6
(613) 788-2525

Special Students

The School of Continuing Education
Room 302, Administration Building
Carleton University
Ottawa, Ontario K1S 5B6
(613) 788-3500

Accreditation of the University

Scholarships, Awards and Bursaries
The Awards Office
Room 202, Administration Building
Carleton University
Ottawa, Ontario K1S 5B6
(613) 788-3600

General Information on Undergraduate Academic Programs
Student Liaison Services
Room 315, Administration Building
Carleton University
Ottawa, Ontario K1S 5B6
(613) 788-3663

Carleton University, a founding member of the Council of Ontario Universities, enjoys full accreditation by the Ministry of Colleges and Universities of the Province of Ontario.

The University is a charter member of the Association of Universities and Colleges of Canada. It is a member of the Association of Commonwealth Universities and participates fully in the Commonwealth Scholarship and Fellowship Plan. It is also a member of the International Association of Universities.

The baccalaureate degree programs in Computer Systems, Civil, Electrical and Mechanical Engineering are accredited by the Canadian Engineering Accreditation Board of the Canadian Council of Professional Engineers.

The degree offered by the School of Architecture is recognized by The Canadian Architectural Certification Board as a prerequisite to apply for certification of academic qualifications for registration to practise as an architect in a provincial association.

The Bachelor of Computer Science Honours Degree Program is accredited by the Accreditation Council of the Canadian Information Processing Society and the Computer Science Association.

The School of Industrial Design was established at Carleton on the recommendation of a study prepared by the Association of Canadian Industrial Designers. Initial funding for the school was supplied by Design Canada, Ministry of Industry, Trade and Commerce.

Carleton University participates in the Ontario Student Assistance Program, other provincial assistance programs and the Canada Student Loans Program and is fully recognized as one of the few participating institutions outside the province of Quebec for bursary assistance through the Quebec Loans and Bursaries Program.

Carleton University's degree programs are recognized in the United States by the Federal Guaranteed Student Loans Program and for student aid to veterans through the Veterans Administration.

The following are some terms frequently used throughout this Calendar, together with a brief explanation of their general meaning. *These definitions do not provide the official, complete definition of the terms as they are applied to the interpretation or administration of University regulations and programs, and must not be so construed.*

Auditing

With the permission of an instructor, students may register in courses as auditors. Auditors receive no grade and no credit for courses audited. (See p. 36.)

Bachelor's Degree (Baccalaureate)

The first university degree, for which a student follows an undergraduate degree program, (e.g. B.A.—Bachelor of Arts).

Bursary

A monetary award based on good academic standing and financial need.

Calendar

A university publication listing courses, degree requirements, faculty and university regulations, and faculty members.

Continuing Education Course

A non-credit course offered through the School of Continuing Education's Non-Credit Division. Continuing Education courses carry no credit towards a university degree program and are not provincially funded.

Continuing Education Student

A student enrolled for non-credit courses and/or workshops offered through the School of Continuing Education.

Credit

The full-course credit is the basic unit of academic work. It is indicated with a value of 1.0 on all records documents. A course marked ★ is a half-credit course (value 0.5). Other courses may have values of 1.5 or 2.0 and are so indicated in this Calendar.

Dean

The academic head of a faculty.

Discipline

The university equivalent of a "subject" in high school.

Faculty

- (a) A major teaching division of the University, divided into departments, schools or other units and headed by a dean. (e.g. Faculty of Arts);
- (b) The academic teaching staff of the University.

Honours Degree Program

A specialized university program, normally four years or 20 full-course credits or their equivalent in length to achieve the degree.

Humanities

Disciplines offered within the Faculty of Arts such as literature, philosophy, languages.

Major

A discipline in which a student specializes.

Major Degree Program

A university program in the Faculty of Science, normally three years or 15 full-course credits or their equivalent in length to achieve the degree.

Mature Applicant

A person who lacks normal entrance requirements as published in the Calendar, but who is 21 years of age or over by December 31 of the year in which he or she wishes to enrol, may receive consideration for admission to a degree program either on a full-time or part-time basis.

Ombudsman

A person who deals with individuals' grievances, complaints, requests for information.

Part-Time Student

A student formally admitted to an undergraduate degree program who (a) for the Faculties of Arts, Social Sciences or Science, is taking a maximum of two full-course credits or their equivalent during any academic session; or (b) for the Faculty of Engineering, is taking a program that has the approval of the Faculty.

Pass Degree Program

A university program in the Faculties of Arts and Social Sciences, normally three years or 15 full-course credits or their equivalent in length to achieve the degree.

Prerequisite(s)

A course or courses that must be completed before the student can enter the course described. In most cases, for example, the student must have taken a 100-level course in a particular discipline before being admitted to a course in the same discipline at the 200 or 300 level. The 100-level course is, therefore, a prerequisite.

Program

A combination of courses over a specific area or discipline, which fulfils requirements for a degree.

Program Year

Progress through degree studies is normally measured in terms of program years. The program year represents the accumulation of the number of credits normally taken in a Fall/Winter session of full-time study in the program in question. In addition, in some jurisdictions, program year implies the accumulation of a certain pattern of credits.

Registration

The process of selecting and enrolling in courses for an academic session.

Scholarship

A monetary award based on academic achievement.

Social Sciences

Disciplines offered within the Faculty of Social Sciences such as Economics, Political Science, Psychology.

Special Student

A student not admitted to a degree program but taking degree-credit courses to qualify for admission, to improve professional or vocational qualifications, for transfer credit, or for personal interest.

Tuition Fees

Fees paid for enrolment in courses.

Undergraduate Student

A university student working towards a bachelor's degree.

Withdrawal

The formal procedure, according to regulations laid down by the University, of withdrawing from a course or courses, or from the University. (See pp. 37 and 44.)

The Academic Year

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Undergraduate Studies

The following schedule contains the dates prescribed by the University Senate for academic activities and for procedures of academic administration.

The academic year is divided into two sessions.

Fall/Winter Session

The Fall/Winter session commences in September and continues until the end of the examination period in April. The *Fall term* of the Fall/Winter session consists of the months September to December. The *Winter term* consists of the months January to April. Courses are offered during the Day and the Evening.

Summer Session

The Summer session commences in May and continues until the end of the examination period in August. The *First term* of the Summer session commences in mid-May and continues until the end of June. The *Second term* commences in July and continues until mid-August. Courses are offered during the Day and the Evening.

Fall/Winter Session 1990-91

March 1

Last day for admission to a program from candidates whose documents originate outside Canada or the United States, and for candidates who are studying inside Canada on a student visa.

July 1

Last day for receipt of applications for admission to a program from mature applicants, from those presenting post-secondary education qualifications and from those transferring from other universities in Canada or the United States.

Last day for receipt of applications for admission to a program from applicants with high school qualifications from Canada or the United States, except for candidates who are studying inside Canada on a student visa.

Last day for receipt of applications for internal degree transfers to allow for registration for the Fall/Winter session.

August 1

Last day for receipt of applications for admission to a program from Special students applying solely on the basis of Carleton University studies.

September 1

Last day for receipt of applications from potential Fall graduates.

September

Orientation Program begins.

September 3

Statutory holiday, University closed.

September 7

Last day to complete registration, including fee payment, for Fall/Winter session without incurring a late registration fee.

September 10

Fall term classes begin.

September 21

Last day for late registration.

Last day for course and section changes for Fall/Winter and Fall-term courses.

September 28

Last day for receipt of applications for supplemental and grade-raising examinations in Summer Session courses.

October 8

Statutory holiday, University closed.

October 20

Summer-session supplemental, deferred final and grade-raising examinations end.

November

Fall convocation for the conferring of degrees, date to be announced.

November 9

Last day for withdrawal from Fall-term courses. (For financial implications of withdrawal, see pp. 37 and 44.)

December 1

Last day for receipt of applications from potential Winter (February) graduates.

Last day for receipt of applications for degree program transfers for Winter term of Fall/Winter session.

December 3

Last day of Fall-term classes.

Last day for handing in term assignments for Fall-term courses, subject to any earlier course deadline.

December 6 – 22

Final examinations in Fall term courses and mid-term examinations in Fall/Winter courses may be scheduled as announced.

January 4, 1991

Last day to complete registration, including fee payment, for Fall/Winter session Winter-term courses, without incurring a late registration fee.

January 7

Winter-term classes begin.

January 18

Last day for late registration for Winter-term courses.

Last day for course and section changes for Winter-term courses.

January 31

Last day for receipt of applications for supplemental and grade-raising examinations in Fall-term courses

February 1

Last day for receipt of applications from potential Spring graduates.

February 15

Last day for partial refund of tuition fees when withdrawing from Fall/Winter courses or from full-time status. (For financial implications of withdrawal, see pp. 37 and 44.)

February 25 – March 1

Study period, classes suspended.

March 1

Fall-term supplemental, deferred final and grade-raising examinations end.

March 15

Last day for withdrawal from Fall/Winter and Winter-term courses. (For financial implications of withdrawal, see pp. 37 and 44.)

March 29

Statutory holiday, University closed.

April 8

Last day of classes for Fall/Winter and Winter-term courses. (Class schedule on this day will be that appropriate to a Friday.)

April 11

Last day for handing in term assignments, subject to any earlier course deadline.

April 11 – 30

Final examinations may be scheduled as announced.

June

Spring convocation for conferring of degrees, date to be announced.

June 28

Last day for receipt of applications for supplemental and grade-raising examinations in Fall/Winter and Winter term courses.

August 6 – 16

Supplemental, deferred final and grade-raising examinations may be scheduled as announced.

Summer Session 1991

March 1

Last day for receipt of applications for consideration for admission to a degree program for the Summer session.

May 1

Last day for receipt of applications for degree program transfers for the Summer session.

May 14

Last day to complete registration, including fee payment for First-term and full-session courses, without incurring a late registration fee.

May 15

Full-session and First-term classes begin.

May 20

Statutory holiday, University closed.
Classes missed may meet May 24.

May 24

Last day for late registration and course changes for First-term and full-session courses.

June 14

Last day for withdrawal from First-term courses.

June 25

Last day of classes for First-term. (Note: Full-session courses resume July 2.)
Last day for handing in term assignments, subject to any earlier course deadline.

June 26, 27

First-term final examinations may be scheduled.

July 1

Statutory holiday, University closed.

July 2

Last day to complete registration, including fee payment for second-term courses, without incurring a late registration fee.
Second-term classes begin.

July 5

Last day for late registration and course changes for Second-term courses.

July 19

Last day for partial refund of tuition fees when withdrawing from full-session courses. (For financial implications of withdrawal, see pp. 37 and 44.)

July 26

Last day for withdrawal from full-session and Second-term courses. (For financial implications of withdrawal, see pp. 37 and 44.)

August 5

Civic holiday, University closed.
Evening classes missed may meet August 9.

August 9

Last day of Summer-session classes.
Last day for handing in term assignments, subject to any earlier course deadline.

August 10, 12, 13, 14

Summer-session examinations may be scheduled as announced.

September 30

Last day for receipt of applications for supplemental and grade-raising examinations in Summer-Session courses.

October 19

Summer-session supplemental, deferred final and grade-raising examinations will be held.

The Organization of the University

Carleton University has Faculties of Arts, Social Sciences, Engineering, Science, and Graduate Studies and Research. In addition there are Schools of Computer Science and Continuing Education. The School of Journalism is associated with the Faculty of Arts. The School of Business, the School of Public Administration and the Institute of Soviet and East European Studies are associated with the Faculty of Social Sciences. The Institute of Biochemistry is associated with the Faculty of Science. The Faculty of Engineering includes the School of Architecture and the School of Industrial Design.

The Faculty of Graduate Studies and Research includes the Institute of Canadian Studies, the Norman Paterson School of International Affairs, Carleton International and the School of Social Work.

The University offers programs of undergraduate study leading to bachelors' degrees in arts, journalism, public administration, commerce, music, science, computer science, engineering, architecture and industrial design; and to a certificate in public service studies, certificates in teaching English as a second language, English language and composition, law enforcement studies, French language studies and French translation studies, and a diploma in music. The University's Faculty of Graduate Studies and Research offers programs leading to degrees in Master of Arts, Master of Journalism, Master of Science, Master of Engineering, Master of Social Work, Master of Computer Science, Master of Management Studies, and Doctor of Philosophy studies in various fields. It also offers a program leading to a Graduate Diploma in Public Administration.

Conduct

Carleton University is a community of faculty, staff and students who are engaged in teaching, learning and research. Its members are part of the community at large and are governed by the law common to all persons. But membership in the academic community also entails certain rights and responsibilities. The University respects the rights of speech, assembly and dissent; it prohibits discrimination on the basis of race, ancestry, place of origin, colour, ethnic origin, national origin, creed, sex, age, marital status, family status, political affiliation or belief, sexual orientation, or any handicap that is defined as such in the Human Rights Code of Ontario; it requires tolerance and respect for the rights of others; and it promotes an environment conducive to personal and intellectual growth.

Accessibility for the Disabled

Carleton University is committed to making reasonable accommodation to individuals with disabilities, and actively encourages application from disabled students. This commitment includes gaining an understanding of the circumstances of an individual's disabilities and adjusting services to all academically qualified individuals to compete on an equitable basis.

The University's application process assures confidentiality insofar as the admission decision is concerned, while identifying the candidate to the Office of the Co-ordinator for the Disabled so that those who gain admission can make the

decision to come to Carleton after assessing the extent to which specialized services will be available.

Academic accessibility is intrinsically linked to physical accessibility. Carleton is committed to continually monitoring and upgrading physical accessibility to whatever extent is possible.

An ongoing committee of the Vice-President (Academic) monitors the needs and problems of disabled students in conjunction with their academic problems and makes recommendations for improvements.

Purpose of the Calendar

The Undergraduate Calendar outlines requirements for admission, information concerning registration, course load, course changes and withdrawals, examinations and graduation. Regulations governing promotion and academic standing are included in the sections of the calendar dealing with each faculty and school. A separate calendar is published by the Faculty of Graduate Studies and Research, the School of Continuing Education publishes the Summer Calendar Supplement.

How to Use the Calendar

All students should familiarize themselves with the contents of this Calendar and make themselves aware of regulations that apply to them, as prescribed by the University as a whole, by individual faculties, by schools, departments or other academic units. The following sections of the Calendar are most important in this regard:

1. *General Regulations:* Regulations applicable to students in all faculties and to special students (p. 23.)
2. *Faculty Sections:* There are sections for each undergraduate faculty: (a) Arts and Social Sciences (p. 51), (b) Computer Science (p. 265), (c) Engineering (p. 279), (d) Science (p. 343). Information on general regulations for each faculty is provided first, and students should make themselves familiar with regulations governing the faculty (and school or institute where applicable) in which they are or will be registered.
3. Following the information on the School of Continuing Education, and the general faculty information, the schools, institutes and departments of the University are arranged in alphabetical order within the faculty of which they are a member. Students should make themselves familiar with the regulations of every department in which they plan to take courses, including those of faculties other than the one in which they are registered.
4. The interdisciplinary section includes: entries for African studies, Asian studies, integrated science studies, interdisciplinary courses, labour studies, medieval studies, technology, society, environment studies, urban studies, visual and performing arts; and information about the Centre for Applied Language Studies. A list of courses for non-majors is also included.

Please consult the index at the back of the book for guidance in finding detailed information and regulations.

Administration of Regulations

Students are responsible for ensuring that the courses in which they register conform to the requirements of their academic program. The regulations published in this Calendar include the main legislation governing admission, standing and graduation for undergraduate study as approved by the Senate. Advice on more specific rules or interpretations that may affect a student's academic status is available from departmental and faculty registrars' offices.

Students have the right to appeal the application of a regulation, and should enquire about procedures at their faculty registrar's office.

Registrarial Services

Registrarial services are available to students through the following offices:

New Applicants and Prospective Students

The Office of Admissions and Academic Records (Student Liaison)
Room 315, Administration Building
Telephone 788-3663

Current Undergraduate Degree, Certificate and Diploma Students

Faculty of Arts and Faculty of Social Sciences (including Business, Journalism, Music and Public Administration)
Room 312, Paterson Hall
Recorded general information, 788-6690
Other enquiries, 788-6691

Faculty of Engineering (including Architecture and Industrial Design)
Room 353, Mackenzie Building
Telephone 788-5668

Faculty of Science
Room 212, Herzberg Laboratories
Telephone 788-4440

School of Computer Science
Room 212, Herzberg Laboratories
Telephone 788-4440

Special Students and Students Enrolled in Non-Credit Courses

School of Continuing Education
Room 302, Administration Building
Telephone 788-3500

Classification of Students

For purposes of studying at Carleton University and for the administration of regulations governing these studies, the following student classifications are recognized.

Full-Time Undergraduate Student

A student who has been formally admitted to an undergraduate program and who:

1. for the Faculties of Arts, Social Sciences, and Science, and the School of Computer Science, is taking a minimum of four credits or the equivalent during the Fall/Winter session

2. for the Faculty of Engineering, the School of Architecture and the School of Industrial Design, is following the course load as shown for each year in those programs.

Part-Time Undergraduate Student

A student who has been formally admitted to an undergraduate program and who:

1. for the Faculties of Arts, Social Sciences, and Science, and the School of Computer Science, is taking a maximum of two full courses or the equivalent during any academic session

2. for the Faculty of Engineering, is taking a program that has the approval of the Faculty.

Special Student

A student who is registered in a degree-credit course or courses but who has not been formally admitted to an undergraduate program.

Continuing Education Student

A student who is registered in a "non-credit" course offered by the School of Continuing Education.

Distance Education

Each year Carleton University offers a number of undergraduate degree-credit courses at locations away from the University campus. A selection of credit courses is available during Carleton's regular terms via Instructional Television (ITV), cable channel 15/B. For further information concerning distance education, contact the School of Continuing Education, Room 302, Administration Building, telephone (613) 788-3500.

Senior Citizens: Tuition Fees

All persons 60 years of age and over as of the last day for late registration may register in degree-credit courses and have their tuition fees waived. The only charge to these students is a \$5.00 per session registration fee, plus the Challenge Fund and Accident/Sickness Insurance charge (applicable to full-time studies).

Other Calendars

Graduate Studies and Research Calendar

Available from:
Dean of Graduate Studies and Research
Room 1512, Dunton Tower
Carleton University
Ottawa, Canada K1S 5B6

Summer Session Supplement

Available from:
Continuing Education
Room 302, Administration Building
Carleton University
Ottawa, Ontario K1S 5B6

Course Values

The basic unit of academic work is the *full course credit*, which is indicated with a value of 1.0 on all records documents.

A course marked ★ is a *half-course credit* and is indicated with a value of 0.5 on all records documents.

Prefix Numbering

Each course number is prefixed by the number or numbers of the department, school or committee under whose auspices the course is offered.

- 02 Interdisciplinary Arts
- 03 Interdisciplinary Social Sciences
- 04 Interdisciplinary Arts and Social Sciences
- 09 Women's Studies
- 10 Interdisciplinary Humanities
- 11 Art History
- 12 Canadian Studies
- 13 Classical Civilization
- 14 Classics
- 15 Greek
- 16 Latin
- 17 Comparative Literature
- 18 English
- 19 Film Studies
- 20 French
- 21 English as a Second Language
- 22 German
- 24 History
- 26 Italian
- 27 Mass Communication
- 28 Journalism
- 29 Linguistics
- 30 Music
- 32 Philosophy
- 34 Religion
- 36 Russian
- 38 Spanish
- 42 Business
- 43 Economics
- 45 Geography
- 46 International Affairs
- 47 Political Science
- 49 Psychology
- 50 Public Administration
- 51 Law
- 52 Social Work
- 53 Sociology
- 54 Anthropology
- 55 Soviet and East European Studies
- 56 Sociology-Anthropology
- 59 Multidisciplinary Technology, Society, Environment
- 60 Interdisciplinary Integrated Sciences
- 61 Biology
- 62 Environmental Science
- 63 Biochemistry
- 65 Chemistry
- 67 Geology
- 69 Mathematics (Majors)
- 70 Mathematics (Honours)
- 75 Physics
- 76 Architecture
- 77 Architecture
- 78 Architecture

- 79 Architecture
- 80 Architecture Design
- 82 Civil Engineering
- 85 Industrial Design
- 87 Aerospace Engineering
- 88 Mechanical and Aeronautical Engineering
- 90 Engineering Business
- 91 Engineering, Common Core
- 93 Information and Systems Science
- 94 Systems and Computer Engineering
- 95 Computer Science
- 97 Electronics
- 99 Engineering Projects

Course Numbering Pattern

The course numbering pattern is, in general, as follows:

001-099

Courses usually taken in Qualifying University year

100-199

Courses usually taken in First year

200-299

Courses usually taken in Second year

300-399

Courses usually taken in Third year

400-499

Courses ordinarily taken in Fourth-year Engineering, Fourth- and Fifth-year Architecture, and Fourth-year (Honours) Arts, Social Sciences, Science and Computer Science.

500-599

Courses ordinarily taken by Graduate students

Note

When the suffix number of an individual course is changed from one year to the next, the former (old) number is noted, for one year only, in parentheses next to the new number in the appropriate "Courses Offered" list.

Programs of graduate study, first offered at Carleton in 1954, provide opportunities for advanced study, research and critical scholarship in a number of disciplines. Carleton's libraries, laboratories and other research facilities enable graduate students to perform scholarly work of consistently high calibre, and help to foster a spirit of independent investigation.

The location of the University in Ottawa also enables graduate students to take advantage of the research facilities connected with many national institutions and government departments.

Carleton University and the University of Ottawa have developed a number of joint programs at the graduate level. The details of these programs are given under the appropriate academic unit in the Graduate Studies and Research Calendar.

Where formal joint programs do not exist, a graduate student may be permitted to follow up to two full courses at the University of Ottawa. Moreover, there are reciprocal arrangements worked out among departments, institutes and schools at both universities to involve students, when it is desirable, in parts of the program of research and studies at the other institution. All interested students should consult the Chair/Director of their department, institute or school, prior to registration, in order to obtain further information on particular departmental conditions of eligibility and procedures.

Graduate programs currently offered at Carleton are the following:

Graduate Diploma in Public Administration (D.P.A.)

Master of Arts (M.A.)

In Anthropology, Canadian Studies, Classics, Comparative Literature, Economics, English, French, Geography, German, History, International Affairs, Philosophy, Political Science, Psychology, Public Administration, Religion, Spanish, Sociology, and Soviet and East European Studies.

Master of Computer Science (M.C.S.)

Master of Engineering (M.Eng.)

In Aeronautical, Civil, Electrical, Materials, and Mechanical Engineering.

Master of Journalism (M.J.)

Master of Management Studies (M.M.S.)

Master of Science (M.Sc.)

In Biology, Chemistry, Computer Science, Geology, Information and Systems Science, Mathematics, and Physics.

Master of Social Work (M.S.W.)

Doctor of Philosophy (Ph.D.)

In Biology, Chemistry, Computer Science, Economics, Engineering (Aeronautical, Civil, Electrical, and Mechanical), Geology, History, Mathematics, Physics, Political Science, Psychology, and Sociology

Joint programs with the University of Ottawa are offered in the following areas: Civil Engineering, Electrical Engineering, Mechanical and Aeronautical Engineering, Biology, Chemistry, Computer Science, Geology, Mathematics and Statistics, Physics, and Economics. The Department of Psychology offers a joint Specialization in Neuroscience.

Research

Graduate studies and research are closely intertwined at Carleton, as in the case of the Institute of Canadian Studies, the Institute of Soviet and East European Studies and the Norman Paterson School of International Affairs.

Of a less formal nature are the many organized research units in such fields as emergency communications, energy, entomology, jurisprudence, regional linguistics, northern and native studies, renaissance studies and multi-disciplinary studies in communications.

In addition, many interesting research projects are thriving, which are outlined in the biennial publication *Research and Studies*, available from the Graduate Studies and Research Office, Carleton University, Ottawa, Canada K1S 5B6.

Special Students

Students interested in pursuing graduate studies at Carleton are urged to note the following University regulation: "Course work completed as a Special student is not normally acceptable for degree credit in the Faculty of Graduate Studies and Research." (See also p. 49.)

Graduate Studies and Research Calendar

The studies of each candidate will be directed by a department, institute, or school, and are governed by the general regulations outlined in the Graduate Studies and Research Calendar. To obtain a copy of this calendar, write to the Graduate Supervisor of the individual unit concerned, or to:

The Faculty of Graduate Studies and Research
Carleton University
Ottawa, Canada K1S 5B6

Administrative Offices

Information Carleton

General inquiries on University services, facilities and programs; University phone numbers, office hours and locations; events, schedules.

Monday to Thursday, 8:30 a.m. - 7:30 p.m.

Friday, 8:30 a.m. - 5 p.m.

Fourth level, Unicentre

788-7400

Admissions

Information and applications for all undergraduate programs, calendars, tours, high school liaison.

Monday to Friday, 9 a.m. - 5 p.m.*

315, Administration Building

788-3663

Athletics

Swimming pool, fitness centre, weight rooms, Nautilus, intramural and varsity sports, fitness classes, fitness testing and lessons.

788-4480 Athletics Office

788-5655 Tuck Shop (squash and tennis bookings)

788-5613 After-hours recording (hours)

Awards Office

OSAP, Canada Student Loans, emergency loans, bursaries, scholarships, financial counselling.

Monday to Friday, 9 a.m. - 5 p.m.*

202, Administration Building

788-3600

Bookstore

University textbooks, stationery supplies, magazines, Carleton merchandise, special orders.

Monday to Thursday, 9 a.m. - 5 p.m.

Friday, 9 a.m. - 5 p.m.*

Second floor, Southam Hall

788-3832

Business Office

Tuition payments and tax receipts, overdue accounts, new or replacement student cards.

Monday to Friday, 9 a.m. - 4 p.m.*

Monday and Thursday evenings, 5 - 7 p.m.

Third floor, Administration Building

788-3632

Canada Employment Centre On-Campus

Carleton's focal point for career planning and job placement. Services include: postings for permanent, summer, and part-time jobs; co-ordination of on-campus recruitment programs, career library and job search information.

Monday to Friday, 9 a.m. - 5 p.m.*

508, Unicentre

788-6611

Counselling Services

Personal counselling for students, staff and faculty, career interest testing, library of calendars from Canadian and foreign universities, resource centre, foreign student advisory service, and academic assistance workshops.

Monday to Friday, 9 a.m. - 5 p.m.* (year round)

501, Unicentre

788-6600

Health Services

Medical appointments, walk-in service, psychiatric counselling, health and nutrition information.

Monday to Friday, 9 a.m. - 5 p.m. (year round)

600, Unicentre

788-6674

Lost and Found

University's central lost and found is run by Buildings and Grounds. Information Carleton also handles enquiries.

788-3668 Buildings and Grounds

788-7400 Information Carleton

Registrars' Offices

Information and assistance on all academic regulation, declaration (change of major/honours), late withdrawals, petitions, changes of address, letters of permission and academic audits.

Arts and Social Sciences

788-6690

315 Paterson Hall

Engineering

788-5668

353 Mackenzie Building

Science

788-4440

212 Herzberg Building

Continuing Education

Special and Non-Degree Students

788-3500

302 Administration Building

Residence Information and Food Services

Information about residence accommodation, off-campus housing, and food services and meal plans.

Monday to Friday, 9 a.m. - 5 p.m.*

223/225 University Commons

788-5615

Students' Association (CUSA)

Student services such as: typing and binding service, exam library, auxiliary health insurance plan, student handbook and student directory, clubs and societies, International Students' Centre, Womens' Centre, Peer Support Centre, Mature and Part-Time Students' Centre, Disability Awareness Centre, Unicentre Store, Rooster's, Oliver's, the games arcade, funding for *The Charlatan*, CKCU-FM, the Ombudsman, and Information Carleton.

Monday to Friday, 8:30 a.m. - 4:30 p.m.

401, Unicentre

788-6688

Continuing Education

Registrar's office for all special students, non-credit courses and workshops, information on itv courses, calendars for non-degree students.

Monday to Friday, 9 a.m. - 5 p.m.*

Monday to Thursday evenings, 6:30 - 8:30 p.m.

Room 302, Administration Building

788-3500

Academic Records

Statements of marks, transcripts, confirmation of enrolment or graduation, and assistance with the touch-tone registration system.

Monday to Friday, 9 a.m. - 5 p.m.*

405, Administration Building

788-3607

Library

Main University library, extensive reference and documents sections, computerized catalogue inquiry system, tours and reference/research assistance, reserve readings for courses, and photocopying centre.

Labour Day to April 30

Monday to Friday 8 a.m. - 11 p.m.

Saturday, Sunday 10 a.m. - 11 p.m.

* May to Labour Day

Monday to Thursday 8:30 a.m. - 11 p.m.

Friday 8:30 a.m. - 11 p.m.

Saturday 10 a.m. - 5 p.m.

Sunday 1 - 5 p.m.

*Hours are reduced when classes are not in session.

Weekend hours to 11 p.m. before examinations in August.

Library closes for all statutory and civic holidays except

Good Friday and Easter Monday.

788-5621 Hours

788-2735 Information/Reference

788-2734 Circulation

Hours*

Labour Day - April 30:

Office hours are Monday to Friday, 9 a.m. - 5 p.m.

May 1 - Labour Day:

Office hours are Monday to Friday, 8:30 a.m. - 4:30 p.m.

Most University offices are closed for lunch between 12 noon and 1 p.m.

Some offices also keep evening hours:

Information Carleton

Monday to Thursday

8:30 a.m. - 7:30 p.m.

Continuing Education

Monday to Thursday

6:30 - 8:30 p.m.

Business Office

Monday and Thursday

5 - 7 p.m.

Bookstore

Monday to Thursday

9 a.m. - 9 p.m.

The library, cafeterias and Athletics Complex are open in the evenings.

Academic Departments

Accounting: see Business, School of

Aerospace Engineering: 203 Mackenzie Building, 788-5684

African Studies: B649 Loeb Building, 788-6671

Anthropology: B750 Loeb Building, 788-2582

Applied Language Studies, Centre for: 215 Paterson Hall, 788-6613

Architecture, School of: 302 Architecture Building, 788-2855

Art History, 2201 Dunton Tower, 788-2342

Asian Studies, 2A49 Paterson Hall, 788-3532

Biochemistry, Institute of: 320 Steacie Building, 788-3889

Biology: 583 Tory Building, 788-3888

Business, School of: 1209 Dunton Tower, 788-2388

Canadian Studies, Institute of: 1110 Dunton Tower, 788-2366

Chemistry: 203 Steacie Building, 788-3841

Civil Engineering: 277 Mackenzie Building, 788-5784

Classics: 2015 Dunton Tower, 788-2301

Comparative Literature: 1726 Dunton Tower, 788-2177

Computer Science, School of: 542 Herzberg Laboratories, 788-4333

Criminology and Criminal Justice: 3A40 Paterson Hall, 788-2588

Directed Interdisciplinary Studies: 2115 Dunton Tower, 788-2368

Earth Sciences: 320 Tory Building, 788-4400

Economics: C876 Loeb Building, 788-3744

Electronics: 417 Mackenzie Building, 788-5754

Engineering, 353 Mackenzie Building, 788-5645

English Language and Literature: 1812 Dunton Tower, 788-2310

English as a Second Language: 215 Paterson Hall, 788-6613

Film Studies: 427 St. Patrick's Building, 788-5606

French: 1602 Dunton Tower, 788-2168

History: 400 Paterson Hall, 788-2828

Industrial Design, School of: 291 Mackenzie Building, 788-5672

Integrated Science Studies: 823 Dunton Tower, 788-2165

Interdisciplinary Studies, Directed: 2115 Dunton Tower, 788-2368

International Affairs, School of: 2A55 Paterson Hall, 788-6655

Italian: 1427 Dunton Tower, 788-2108

Journalism, School of: 346 St. Patrick's Building, 788-7404

Labour Studies: 414 Paterson Hall, 788-2825

Law: C473 Loeb Building, 788-3690

Law Enforcement Studies: 3A40 Paterson Hall, 788-2588

Linguistics: 249 Paterson Hall, 788-2802

Mass Communication: 310 St. Patrick's Building, 788-7408

Mathematics and Statistics: 710 Dunton Tower, 788-2155

Mechanical and Aerospace Engineering: 203 Mackenzie Building, 788-5684

Medieval Studies: 2209 Dunton Tower, 788-2351

Music: A911 Loeb Building, 788-3733

Philosophy: 2125 Dunton Tower, 788-2110

Physics: 316 Herzberg Laboratories, 788-4377

Political Science: B640 Loeb Building, 788-2777

Psychology: B552 Loeb Building, 788-2644

Public Administration, School of: 1001 Dunton Tower, 788-2547

Religion: 2116 Dunton Tower, 788-2100

Russian: 3A36 Paterson Hall, 788-6646

Social Work, School of: 469 St. Patrick's Building, 788-5601

Sociology: B750 Loeb Building, 788-2582

Soviet and East European Studies, Institute of: 459 Paterson Hall, 788-2888

Spanish: 1419 Dunton Tower, 788-2109

Systems and Computer Engineering: 377 Mackenzie Building, 788-5740

Technology, Society, Environment Studies: 460 Steacie Building, 788-4483

Urban Studies: See Directed Interdisciplinary Studies

Visual and Performing Arts: 427 St. Patrick's Building, 788-3738

Women's Studies, Institute of: 330 Paterson Hall, 788-6645

Athletics and Recreation

Physical Recreation Centre
Telephone 788-4480 or 788-5631 (recording)

The physical recreation program has been designed to meet three general areas of interest: interuniversity athletics, intramurals, and recreational skill instruction. Although many university students enjoy the challenge and excitement of interuniversity athletics, others frequently prefer a less demanding level of competition in Carleton's intramural program, while yet another segment of the University community desires physical expression almost completely devoid of all competition.

To meet these needs, skill-instruction classes are offered in squash, dance, yoga, fitness, ju-jitsu, karate and swimming.

The intramural program includes touch football, softball, soccer, basketball, broomball, volleyball, badminton, swimming and hockey. Some of these activities are co-educational.

Carleton's Varsity teams for men (The Ravens) participate in basketball, football, rugby, soccer, swimming, waterpolo, cross-country skiing and fencing. The University is a member of the Ontario Universities Athletic Association.

The women's Varsity teams (The Ravens) are members of the Ontario Women's Intercollegiate Athletic Association and participate in basketball, volleyball, swimming, cross-country skiing, fencing, field hockey, soccer and waterpolo.

The University's present outdoor athletic facilities include football and soccer fields, a broomball rink and five tennis courts. The indoor facilities consist of a fifty-metre pool and ten-metre diving platform; a fitness centre with jogging track, weight training and fitness testing equipment; a large double gymnasium with a combatives room; nine international and four American squash courts; Nautilus Centre; and heavy-weight training room. The facilities may be available to students either for recreational needs or for organized competition.

The athletics program at Carleton is governed by an Athletics Board, which advises the University on matters of athletics and recreation policy, through the Office of the President. The Board is comprised of members from the Faculty, Administration, the Students' Association and the Residence Association.

Awards Office

Room 202, Administration Building
Telephone 788-3600

Medals are the major academic awards granted by the University to its superior graduating scholars. They have no monetary value.

The Awards Office is responsible for the administration of undergraduate scholarship and bursary programs and loans for graduate and undergraduate students.

Scholarships are awarded on entry to the University and to those in course on the basis of superior academic performance. Applications are not required except for the top three entrance scholarships. (See p. 434.)

Awards and prizes are awarded for excellence in particular areas of study. They may be cash awards or book prizes. No applications are required.

Bursaries are awarded to students who can show genuine evidence of financial need and who have satisfactory academic standing. Students are expected first to apply for provincial assistance. (See below.)

Financial Aid for Students

Administration of Awards

1. Students receiving scholarships and bursaries exceeding in total \$500, and which are under the jurisdiction of the University, will ordinarily be paid in two instalments, one in October and one in January. The University reserves the right to withhold the payment of the second instalment in cases where students do not meet the conditions of the award. Awards of less than \$500 will ordinarily be paid in one instalment, in October.

2. Scholarship and bursary recipients who withdraw before the completion of their year will be expected to refund their bursaries or scholarships (or a portion thereof).

Government Aid Programs

Ontario Residents

Canadian citizens or landed immigrants (permanent residents) who are residents of Ontario may qualify for assistance from the Ontario Student Assistance Program. The financial aid scheme is designed to supplement, rather than replace, family and/or student resources. In order to determine the additional funds required, the province objectively assesses the resources of the family and/or the student that could reasonably be used to provide for the student's educational costs. The assistance could be in the form of an Ontario Study Grant, a Canada Student Loan and/or Ontario Student Loan. The maximum loan/grant award a student can receive in one academic year is usually the total amount of his or her allowable educational costs. Application forms and further information can be obtained by contacting the Awards Office at Carleton or the Student Awards Branch of the Ministry of Colleges and Universities, P.O. Box 4500, Thunder Bay, Ontario P7B 6G9.

Students wishing to have applications processed in time for Fall registration must ensure that completed forms are submitted to the Awards Office by July 1.

Residents of Other Provinces/Territories Except Quebec

Canadian citizens or landed immigrants (permanent residents) from the territories and all other provinces except Quebec may qualify for assistance from the *Canada Student Loans Plan* through their home province. The maximum loan available per academic year is currently \$105 a week. The loan is interest free while the student is enrolled in a 60-percent course load and for six months thereafter. Some provinces also make available non-repayable grant assistance along with this federal loan.

The Awards Office disburses general information on the various provincial aid schemes but application forms and details on individual programs must be obtained from the authorities in the home province. Deadline dates vary but, generally speaking, it is wise to apply for financial assistance through the appropriate provincial department before June 30.

Quebec Aid

Applications from students for assistance from the Province of Quebec should be made directly to the Awards Office. Deadline dates for submission of applications are: May 31 for all students who submitted an application for the previous school year; and June 30 for all students who did not submit an application for the previous school year. In order

to be accepted by the Department of Education, all applications must be coded by the Awards Office.

Part-Time Students

Solely for purposes of federal/provincial financial aid schemes (except Quebec), part-time students are classified as those enrolled in fewer than three full-credit courses. These students are advised to contact the Awards Office for information on the availability of financial aid for part-time study.

Bursaries

Bursaries administered by Carleton University are awarded to students who have a sound academic standing and who show evidence of genuine financial need.

One application only, available in the Awards Office, is required for bursaries that are administered by Carleton.

For details of medals, scholarships, prizes, bursaries and loans see pp. 434-452.

Regular Officer Training Program (ROTP)

The Department of National Defence sponsors, among other programs of university education, the Regular Officer Training Program (ROTP). Training is divided into two parts: normal attendance at university during the academic year and military training each summer. A period of compulsory military service is also a condition of acceptance into the program. The plan combines university subsidization and career training as an officer in the regular component of the Canadian Armed Forces, with successful applicants being enrolled in the rank of Officer Cadet.

All tuition and other essential fees and a monthly salary to cover living expenses are paid, free medical and dental care is provided and annual leave may be granted each year.

Students are eligible to apply provided they have at least one full year remaining before graduation. Applicants must be Canadian citizens, be physically fit for enrolment in the armed forces and be at least 16 years of age on January 1 of the year they commence first-year university studies.

For further information, contact the Canadian Forces Recruiting Centre, 424 Cooper Street, Ottawa, telephone (613) 992-3038.

Placement and Career Counselling: Canada Employment Centre

Room 508, University Centre
Telephone 788-6611 or 996-9590

The Placement and Career Counselling Service is provided by Employment and Immigration Canada through the establishment of an on-campus Canada Employment Centre (CEC). The purpose of the service is two-fold:

1. To provide students with readily available access to employment opportunities. To this end the centre maintains job-boards listing part-time, summer and permanent employment opportunities. In addition, each year the centre arranges for a large number of representatives from government, business and industry, both local and national, to recruit at Carleton. While the majority of these visits are for the purpose of recruiting for permanent employment, a number are arranged for undergraduates seeking summer employment. Students interested in participating in this

program are advised to contact the centre upon returning to classes in the Fall, because recruiting visits commence early in October.

2. To provide students with information about and assistance in preparing for entry into the labour market. Counselling, covering such topics as the interview, labour-market trends, the job hunt and résumé preparation, is available to students seeking or preparing for employment. Students can supplement the counselling provided by reviewing materials maintained in the centre's library, as well as by contacting Counselling and Student Life Services, located in Room 501, University Centre.

All placement and career counselling information may be obtained by contacting the centre or referring to CEC bulletins posted throughout the University. The University papers and radio station are additional sources of information from the centre.

Student Housing and Food Services

Residences

Telephone 788-5612

The residences are located on campus and close to classrooms, the library, and other University facilities. The underground tunnel system makes travel to other University buildings easy in all weather. Each residence building is provided with T.V. lounges, study areas and laundry facilities. Students' rooms are equipped to meet the basic needs of students.

Full-time students of the University are eligible to apply to live in residence, with first-year students with a high school leaving average of 80 percent or better being given preference. The residence contract covers the period from September through the Spring examinations, except for a short period at Christmas when the facilities are closed.

All residents participate in the residence meal plan, which provides lunch and dinner each day, seven days a week.

To receive a residence application form, students new to Carleton should indicate on the University application that residence is desired. Residence materials and detailed information are sent to students concurrently with the offer of admission to full-time study at Carleton. Students who are currently registered at Carleton need only visit the Student Housing Office to obtain an application for residence. For further details about residence services or procedures, students should contact the Student Housing and Food Services Office.

Off-Campus Housing

Telephone 788-5614

The Off-Campus Housing Service is designed to provide assistance in finding suitable accommodation to students who cannot be accommodated or are not interested in on-campus residential housing. Listings range from rooms to private houses, giving the rates and amenities provided. This service has been set up to aid out-of-town students, but it is *not* a rental agency. Listings (not available for distribution) are posted in a glass-enclosed case in the foyer outside Room 223 of the Commons Building, and are available 24 hours a day, seven days a week. The off-campus listings are also available at any terminal on campus by typing "HOUSING" when the command "enter class" appears. The University does not undertake to inspect or

approve any of the facilities listed by the Off-Campus Housing Section.

In addition a service called "Faculty and Staff Listing" is maintained. This lists houses of staff members going on sabbatical leave for periods ranging from six months to two years. The list is available on request.

Food Services

Telephone 788-5612

A-la-carte food service is available at five cafeterias on campus:

The Peppermill, second level, Unicentre;
Hugo's, first level, Unicentre;
The Loeb Cafeteria, first level, Loeb Building;
The Fit Stop, first level, Physical Recreation Centre;
The Oasis, first level, University Commons

Many vending machines are also distributed around campus for off-hour service or quick drinks and snacks.

People may eat in the Residence Dining Halls, third level, University Commons, either by purchasing one of several meal plans for the entire term or by purchasing a single-meal ticket from the Commons Service Desk. Once inside the Residence Dining Halls, the meal is self-service, all-you-can-eat (except on special occasions). Students who purchase a meal plan are exempt from paying the eight percent provincial sales tax.

In addition, full catering services are available to provide a banquet, party trays, and bar service for groups of up to 600. We will even bake a birthday cake for you to give to a friend. To arrange for catering services, telephone 788-5620.

Tour and Conference Centre

Telephone 788-5611

Each year from May to August, the Housing and Food Services Department operates a successful Tour and Conference Centre. Residence facilities accommodate up to 1,100 guests. A wide range of services including accommodation, catering, meeting rooms, lecture theatres, all at very reasonable rates, are available to conferences and tour groups.

Accommodation is also available to short-term summer visitors.

Arrangements for special functions such as wedding receptions, banquets, parties (large and small) and special meetings or other special events are also co-ordinated by the Tour and Conference Centre. Such events may be booked throughout the year.

For further information contact: Tour and Conference Centre, Room 223 Commons Building, 788-5611.

Health Services

Telephone 788-6674

Health Services is provided to protect and improve the physical and mental health of the University community. Responsibilities are to provide consultation, treatment and advice on matters of health, and to ascertain the fitness of students to perform academic work. When the necessary service cannot be provided by the program, appropriate referrals will be made. Confidentiality is respected at all times.

Health Services has regular hours and is staffed by physicians, nurses, psychiatrists and administrators.

The clinic is on level 6 of the University Centre, open from 9 a.m. to 5 p.m. Monday to Friday; evening clinics are available. For an appointment call 788-6674.

Psychiatrists are in attendance for those requiring psychiatric assessment or care. The services provided by these facilities are available to all students of the University, and are covered by provincial health insurance.

The Health Education program promotes healthy lifestyles and wellness. On-going educational programs on contraception, sexuality, alcohol awareness, weight control, etc., are offered. You may contact the Health Educator at 788-6676 for details.

Immunization Record

It is recommended that new students:

1. have a Tuberculin Skin Test unless they are tuberculin-positive, in which case a chest X-Ray is required; and
2. obtain from their family physician documentation of their immunization status to red measles, German measles, mumps, polio and tetanus.

Counselling and Student Life Services

Counselling and Student Life Services is an educational resource centre available to all members of the University community. A qualified team of counselling professionals offers the wide range of services and programs listed below.

All contacts with Counselling and Student Life Services are voluntary and strictly confidential. Information is released only upon the request and with the consent of the client involved. Other types of assistance include appropriate on- and off-campus referrals when required and consultation regarding the problems of another person.

The centre is located in Room 501, Unicentre, with office hours from 9 a.m. to noon and from 1 to 5 p.m. For further information about services and programs, contact the centre in person or call 788-6600.

Counselling Services

Personal counselling can help individuals deal more effectively with emotional and social concerns. Educational and career counselling involves learning to plan wisely, handle difficulties and make decisions with regard to academic and vocational concerns. Individual and group approaches are used in providing counselling and therapy.

Testing Service

A testing program is designed in consultation with a counsellor and constitutes an individual assessment according to the type of self-knowledge required. Relevant information generated by interest, personality, and ability-test results is used in helping the client to determine goals and make choices.

Information Service

A resource centre is maintained for use in educational and vocational planning. It includes materials on occupations, university and community college calendars, directories and other types of career literature. Information about other

sources of assistance at Carleton and in the greater Ottawa community is also available.

Learning Assistance Service

Group programs or individual counselling are available to students who want to develop better study strategies. Some of the areas where help is available are textbook reading, note-taking, concentration and time management problems, seminar presentations, essay writing and studying for exams.

Campus Life Orientation

The program provides direct and indirect service to students at the University. Its main goal is to assist new students in a variety of areas (e.g. academic, social, emotional) thereby easing the transition to life at Carleton University. In addition to initial activities, services and programs are offered throughout the year.

Foreign Student Advisory Service

Telephone 788-6602

Students from other countries can discuss any concerns pertaining to their particular situation, with the staff at the Counselling and Student Life Services. Information concerning university education, financial assistance, health coverage, immigration regulations and the general adjustment to a new living situation is available through the service. The advisory service is also a good place for students to make contacts with other foreign students.

Group Programs

These programs afford opportunities to be involved in a variety of experiences in which learning is best facilitated through group participation. They are offered periodically throughout the year. The nature and content of programs are publicized along with dates and registration details.

Program for the Disabled

A variety of services and programs for the Disabled are offered by the office of the Coordinator for the Disabled. (See section on Facilities for Disabled Students.)

Writing Tutorial Service

The Writing Tutorial Service offers individual tutorials to students who want advice on the writing of university essays. The tutors provide practical instruction on all aspects of the writing process from the initial research and data-gathering, to the exploration and organization of ideas, through to the final preparation of the manuscript. In addition, the service regularly presents workshops on style and minicourses on the general principles of essay writing; the timetable for such courses is posted around campus and announced in *This Week* and *The Charltonian*. The service is offered free of charge to all Carleton students, part-time and full-time, graduate and undergraduate. For an appointment or information, call 788-6632 or visit Room 215, Paterson Hall from 9 a.m. to 4:30 p.m., Monday to Friday.

Facilities for Disabled Students

Paul Menton Centre for Persons with Disabilities

Co-ordinator for the Disabled
Associate Co-ordinator
Learning Specialist
Room 500, Unicentre
Telephone 788-6608 (voice or TDD.)

Mobility Impaired

The campus of Carleton University is well equipped for accommodating physically disabled persons. The buildings are in close proximity to each other and most are connected by tunnels. All of the main buildings have elevators and are ramped for outside entrance and egress. Many sidewalks have been made accessible by curb-cut renovations. An accessible washroom for exclusive use of the disabled exists at the tunnel entrance to Paterson Hall. Keys for student use during the academic year can be obtained from the Co-ordinator.

Residence Program for the Disabled

A limited number of disabled students are admitted into the Carleton Residence Program for the Disabled each year. Admission to the program is based upon fulfilling some or all of the following criteria: the need for attendant care service, level of disability, the availability of space in an accessible room, whether or not the applicant has housing alternatives within the Ottawa area, and the date of application. (For further information regarding application to the program, contact the Support Services Co-ordinator (788-6615) or the Accommodations Officer in the Housing Office, 788-5612.)

Twenty-Four Hour Support Service Program

Twenty-four hour support services are now available for up to ten disabled students. For more information contact the Support Services Co-ordinator or the Co-ordinator for the Disabled at 788-6615/6608.

Counselling

The Associate Co-ordinator is available for counselling appointments. Disabled students are welcome to make appointments for any personal or student related difficulties they may encounter. For more information contact the Associate Co-ordinator at 788-6608.

Visually Impaired

A study room in the Library has been designated for disabled students' use. A room in the MacOdrum Library has equipment for the visually impaired and is a quiet study area for all disabled students. Enabling equipment includes two Visualtek, large print readers; a braille, and a large screen, large print computer terminal with printer and synthesized voice components. Keys for the study area and/or for the tunnel elevator can be obtained from the Stack Supervisor at 788-2733. Enquiries about keys may also be made at the Book Return, located at the second floor entrance to the library.

Susan Tudin acts as contact person for disabled students in the library, and can be reached at 788-2736.

Hearing Impaired

Personal FM systems, and an auditorium FM sound system are now available for loan to hearing-impaired students at

Carleton. Students may pick up and return equipment to the Instructional Media Department in Southam Hall in order that it can be available for both day and evening use. For further information contact the Learning Specialist at 788-6608.

The Learning Specialist also acts as liaison for the Educational Support Services program. The program provides interpreter service, professional note-takers and FM Systems for eligible part-time students.

Learning Disabled Students

It is the intention of faculty and staff at Carleton University to accommodate the reasonable special needs of the learning disabled student. It is recommended that the student have a psychological assessment conducted in order that University staff may best and most effectively provide services that address each individual's particular learning disability. Room 403 in the MacOdrum Library has computer equipment with a synthesized voice component which may be of use to some LD students.

Students seeking help with their particular learning disability, or information with regard to Carleton University's policy for the learning disabled may initiate enquiries with the Learning Specialist. In addition, students wishing to be tested or retested may seek information at this office.

Accessibility and Resource Guide

A new accessibility guide for students with disabilities is prepared for distribution each calendar year. For further information contact the Co-ordinator.

NEADS

The National Educational Association of Disabled Students' administrative office is located at Carleton University. Enquiries regarding this national advocacy association can be made to Frank Smith, Room 513 Unicentre, (613) 233-5963, or to the Co-ordinator for the Disabled.

Carleton Disability Awareness Centre

A new resource/drop-in centre is funded by CUSA in Room 513, Unicentre. The centre is staffed by part-time co-ordinators, and is open from 9 a.m. to 5 p.m. Monday to Friday. Enquiries are welcomed from both able-bodied and disabled students at 788-6618.

Bookstore

The University Bookstore, located in Southam Hall, stocks all required textbooks and offers a wide variety of reference and general books. A complete line of school supplies, imprinted software and gifts is also available.

Bookstore hours are (from Labour Day to April 30):
Monday through Thursday, 9 a.m. to 9 p.m.
Friday 9 a.m. to 4:30 p.m.

Hours are subject to change and will be posted at the Bookstore entrance.

Extended and summer hours are posted at the Bookstore entrance.

The Bookstore has a limited refund and exchange policy at the opening of each term and students are urged to review the policy posted in the Bookstore before buying their texts. *The Bookstore sales receipt is required for any refund or exchange.*

University Centre

The University Centre, known as the Unicentre, is the building that houses many recreational and educational services and conveniences that people may need or desire in their daily life on campus. The relaxed and informal atmosphere of the centre allows for many events of interest and discussion outside the classroom. The Students' Association, which manages the centre, encourages individuals and groups to take advantage of the services and facilities within the University Centre.

These services and facilities are: Off-Campus Student Centre (The Den), Student Employment Labour Pool, Mature and Part-time Students' Centre, Peer Support Centre, a Public Interest Research Group, Women's Centre, International Students' Centre, Disability Awareness Centre, Information Services, Photo Service, A Games Area including an Arcade and Billiards, Variety Store, Oliver's Pub and an expanded Coffee House (Rooster's), and Radio Station (CKCU-FM 93.1), Student Newspaper (*The Charlatan*), hairstylist, Canada Employment Centre, travel agency, and the offices of the Students' Association, the Ombudsman, the Graduate Students' Association, and the Co-ordinator for the Disabled. Rental facilities (Porter Hall) for both on-and off-campus groups are also available in the University Centre.

Office of the Ombudsman

Jim Kennelly
University Ombudsman

Room 511, University Centre
Telephone 788-6617

The Office of the Ombudsman deals with a variety of grievances and complaints as well as with requests for information. A few examples of the on-campus and off-campus problems include academic appeals, landlord and tenant questions, fee enquiries, immigration difficulties. Financing of this service is provided equally by the University and the Students' Association (CUSA).

Computing and Communications Services

Computing and Communications Services
Room 401, Administration Building
Telephone 788-3700

Carleton University offers a wide range of computer services to its students. In addition to the main computing system, a Honeywell DPS 8/49 triple processor under the CP-6 operating system, there are 12 microcomputer networks used for instruction. As well, many departments have their own mini- and micro-computer systems applied to current research work.

Comprehensive data analysis packages such as SPSS and BMDP, and the NAG mathematical library, are available for general research applications. Several easily-used plotting programs have been developed to facilitate the use of graphics. A "Directory of Services" is available, summarizing the facilities and services offered.

The Chaplaincy

T28, T30 Tory Tunnel (across from the Post Office), Neil Hunter, Chaplain, telephone 788-4449; Newman House, 1061 Bronson Place, Michael Peterkin and Philip Fraser, Chaplains, telephone 237-5616, Office, 127G Unicentre, 788-2896.

For over two decades a chaplaincy service has existed at Carleton. Part of our function is to share experiences, insights, friendships and our faith. We are also involved in study and discussion groups, community projects, development education, marriage preparation and religious services. In addition, we have connections with many organizations and resources on campus as well as with churches and religious groups in the Ottawa area.

The two principal chaplains (Protestant-Ecumenical and Roman Catholic) are supported by a number of people in the Chaplaincy offices, which are open most days. Appointments are not necessary but at times they are advisable. People are encouraged to visit the offices at any time.

Next to the offices in the Tory Tunnel there is a Quiet Room, which is used for individual meditation, religious services, and prayer group activity. It is open all day, five days a week. In addition, Father Peterkin and Brother Philip Fraser exercise a ministry at Newman House. The house is open to all as a drop-in centre and it accommodates smaller groups who wish to meet there.

Child-Care Centre

The Colonel By Child Care Centre has two locations on the University campus:

Renfrew House: for children six months to two-and-a-half years of age. Telephone 788-7483.

Loeb Building: for children two-and-a-half to five years of age. Telephone 788-2715.

The Centre is a parent co-operative staffed by qualified personnel.

It is open Monday to Friday from 8 a.m. to 5:45 p.m. and offers a hot lunch and two snacks. Because there is an extensive waiting list, please contact the appropriate centre as early as possible.

Carleton University Students' Association

Room 401, University Centre
Telephone 788-6688

The Carleton University Students' Association (CUSA) is a separately incorporated student-run organization that promotes the interests of the student body. Every student at Carleton is a member of CUSA.

The policy body of CUSA is the 34-member Students' Council, elected annually by the student population. Representation on Council is proportional by faculty, plus a President and Finance Commissioner elected at large.

CUSA funds and/or operates a variety of services such as the Radio Station (*CKCU-FM 93.1*), a student newspaper (*The Charlantan*), Off-Campus Student Centre (The Den), Student Employment Labour Pool, Mature and Part-time Students' Centre, Peer Support Centre, a Public Interest Research Group, Women's Centre, International Students' Centre, Disability Awareness Centre, Information Carleton, Photo Service, and exam library, typing and binding service, fax service, Drug and Accident Reimbursement plan, various publications including a student handbook and a telephone directory, an assortment of clubs and academic societies, alternate education programs, speaker series, as well as concerts. CUSA includes in its activities the operation of The Unicentre Store, a Games Area including an Arcade and Billards, an expanded Rooster's Coffee House and a pub called Oliver's.

CUSA as a lobbying body represents the students' interests to all levels of government and administration. These efforts are helped by the associations, and therefore the students' membership in various federated student organizations.

Students in the faculties of Engineering and Commerce pay a fee of \$15 to their respective Student Societies and automatically become members of these groups.

The Students' Association is continually working to improve and expand its sphere of activities. To do so, CUSA welcomes student input and ideas, and individuals as well as groups are encouraged to make their feelings known to the elected members. Remember, it's your students' association.

Room 510, Administration Building
Telephone 613-788-3636

The Carleton University Alumni Association represents the 50,000-plus graduates of Carleton University. Membership is automatically extended to all graduates, and is available, upon request, to students who have completed five full credits but are no longer registered at Carleton.

The objectives of the association are to advance the excellence and prestige of Carleton University as a distinguished institution of higher learning in Canada, and to encourage a spirit of loyalty, friendship, service and benevolence among the members.

The Alumni Association serves the University by promoting its well-being through contact with the graduates, the government, the public, the faculty, students and potential students. It is governed by the National Alumni Council.

All graduates with known addresses receive *Carleton University Magazine* published by the Carleton University Press. The office maintains alumni records to assure a meaningful and continuing dialogue between alumni and the University.

Alumni are encouraged to support the University by contributing to the Challenge Fund. Contributions to the fund help to support projects that cannot be covered by the University's budget. Funds from alumni help to support the library, student aid and other specific projects.

The Alumni Association sponsors reunions and an alumni award program, and assists groups who wish to organize functions for alumni. The association is a young organization and welcomes suggestions for programs and activities that would be of benefit to the University community.

Members of the Alumni Council for 1989-90:

Clayton Beattie, BA/51, (President)
Geordie Adams, BA/89
Gerard Buss, BA/73
Sandy Carson, BJ/87
Donald Climo, BA/51, BCom/52
Nancy Coldham, BJ/76
Christopher Egan, BA/85, BCom/87
Patricia Finn, BA/80
Christine Fisher, BAHons/75, MA/77
Lindsay Franklin, EngCert/50
Eleanor Nesbitt Friis, BAHons/68
James Hanson, EngCert/58, BA/72
Robert Hindson, BSc/66
Warren Kinsella, BJ/84
Andrew Love, BA/78, MA/84
Jack McAuley, BA/74
John McGee, BA/67
Jone Mitchell, BAHons/73
Robert O'Kell, BAHons/64
Victor Owen, MA/82
Peter Pivko, BArch/78
Robert Richardson, BAHons/85
David Walker, BAHons/70
James Watson, BA/83.

General Regulations

Admission Requirements and Procedures

24

Administration Building, Room 315
Telephone: 788-3663

General Admission Requirements

Persons wishing to follow programs of study leading to a degree, certificate or diploma must be formally admitted to the University.

Persons wishing to register in degree-credit courses without having been formally admitted to the University may do so as Special students. See pp. 28, 48-50.

Applicants should note that in view of limited accommodation in certain programs, holding the minimum admission requirements can only establish eligibility for selection to the University.

This publication contains admission requirements for the 1990-91 academic year only. Students wishing to apply for 1990-91 should contact the Office of Admissions and Academic Records for information on requirements and procedures.

Individuals who are in any doubt about their eligibility for admission are encouraged to enquire at the Office of Admissions and Academic Records.

In the past few years, considerable flexibility has been introduced into the admission requirements but, at the same time, essential features have been preserved. As admission requirements are subject to continuing review, the University will most certainly make additional changes in the future, but only when convinced that these changes will be in the best interests of the student.

Multiple Undergraduate Programs

Students who already possess an undergraduate degree, certificate, or diploma from another university or from Carleton University, may apply for admission to a second undergraduate program. In such circumstances, the minimum requirement will be five additional credits, at least three of which must be in the area of specialization of the new program. For a second or subsequent undergraduate program, the appropriate residence requirement must be met (see p. 37).

English Language Requirements

1. In order to be eligible for unconditional admission to a degree program at Carleton University, all visa applicants and Canadian residents and citizens whose mother tongue is not English or French are required to:

- (a) present a minimum score of 580 on the *Test of English as a Foreign Language* (TOEFL); or
- (b) present transcripts to indicate that they have studied for the last four years in a Canadian secondary school in which the language of instruction is English.

2. Students whose mother tongue is French must present transcripts to indicate that they have taken four years of Anglais in a Canadian secondary school in order to be admitted unconditionally.

3. Visa applicants and Canadian residents and citizens who do not meet the requirements in 1 or 2 above are required to take an approved assessment of English as a Second Language administered by the University's Centre for Applied Language Studies (CALS). Depending on the results of this assessment, and based on the recommendations of CALS, these applicants may be:

- (a) admitted to a degree program without further English

language requirements; or

- (b) admitted to a degree program and permitted to register for a program of full- or part-time studies that includes one or more credit courses in English as a Second Language concurrent with these courses during the first terms of study; or

(c) granted conditional admission requiring the satisfactory completion of pre-credit intensive courses in English and/or credit courses in English as a Second Language, concurrent with a limited number of courses in their field before being admitted to a degree program; (upon the recommendation of CALS, overseas students whose TOEFL score is less than 580 may be granted conditional admission before they arrive in Canada. All applicants granted conditional admission must complete an assessment at the Centre before being permitted to register at Carleton. Students will not be permitted to retain the status of conditional admission for longer than one Fall/Winter session and one Summer session without the approval of CALS.); or

- (d) permitted to register as Special students on the condition that they enrol concurrently in an appropriate English as a Second Language course; or

(e) permitted to register in non-credit English as a Second Language courses offered by CALS, see pp. 67-68, 422.

For further information regarding English language requirements and admission, contact the Office of Admissions and Academic Records.

Dates of Entry

Students may be admitted to register in May and July as well as in September. (See pp. 8-9 for details on the Academic Year.) It should be noted however, that a full range of courses is only offered during the Fall/Winter session, i.e. September to May.

Levels of Entry

Students may be admitted to Qualifying-University, First or upper years depending upon academic qualification. When a student is admitted at the Qualifying-University-year level, a Pass degree program is normally four years in length (i.e. Qualifying-University, First, Second, Third) and an Honours degree program is normally five years in length (i.e. Qualifying-University, First, Second, Third, Fourth). When a student is admitted at the First-year level, the degree program is reduced by one year, i.e. normally three years for a Pass degree and four years for an Honours degree. Beyond First year, remaining degree requirements are determined by the total number of credits required for that particular degree program less those credits granted on transfer from previous post-secondary study.

It should be noted that students who are being considered for admission to the Qualifying-University-year level may, at the time of admission, receive credit for work completed at that level in the Canadian high school system.

Concurrent Studies

The Concurrent Studies program enables Secondary School students to begin University-level study while completing any outstanding requirements for their high school diploma. The availability of the Concurrent Studies program will be of particular interest to those students in semestered schools who are not taking a full load of high school credits in their final year of study. Students in non-semestered high schools may also wish to take advantage of this opportunity in their final year if they are not taking a full credit load.

Students who wish to take advantage of the Concurrent Studies program will register as Special students. Special

students are permitted to take up to two approved First-year credits in the Fall/Winter Session and two approved First-year credits in the Summer Session. With admission to a degree program, program requirements for a degree will be reduced by the number of credits successfully completed as part of the Concurrent Studies program that are appropriate to the degree. Other universities normally grant credit on admission for courses taken at Carleton as a Special Student.

Accelerated Progress

Exceptional students who are entering Carleton's Qualifying-University year will be interested in the accelerated progress policy. This unique policy is designed to enable very capable students to proceed towards a degree at a rate commensurate with their ability in university work.

Above-average performance is rewarded with a reduction in credit requirements. For example, in an Arts or Science program, the maximum reduction possible under this policy could result in a student obtaining a degree in three years beyond Grade 12. Detailed requirements are shown in the Calendar entries for faculties.

Qualifying-University Year

This program is offered in the Bachelor of Arts, the Bachelor of Engineering and the Bachelor of Science programs. Since all other undergraduate degree programs begin at the First-year level, students interested in these programs must first complete an appropriate Qualifying-University year program in Arts, Engineering or Science. (See Summary on pp. 31-35.)

Certificate and Diploma Programs

In addition to offering ten undergraduate degree programs, for which the admission requirements are stated on the following pages, Carleton offers five certificate programs and one undergraduate diploma program, as follows:

Certificate in English Language and Composition

Admission Requirements

A university degree or teaching certificate. This is an in-service certificate intended primarily for practising teachers, in order to upgrade their knowledge of those areas of language and of writing theory that underlie the Ontario guidelines and support documents.

Refer to p. 115 for program details.

Certificate in Public Service Studies

Admission Requirements

The basic admission requirement is the completion of the Ontario Secondary School Diploma including six Ontario Academic Courses, or the equivalent, with a minimum overall average of 60 percent. Special consideration will be extended to other applicants under Mature Applicant regulations (see Mature and Special Admissions, pp. 28, 48-50.)

Candidates may be admitted with advanced standing, but must complete at least four credits, including all core courses, for the Certificate at Carleton University. Students who have completed an undergraduate degree are not eligible for admission to this program.

Refer to pp. 223-226 for program details.

Certificate in the Teaching of English as a Second Language

Admission Requirements

Applicants are admitted on the recommendation of the Department of Linguistics. Applicants have normally completed a first degree in another discipline, or a course of study in a teacher training college. Others with a strong academic background or with experience in the teaching of English as a second language may be admitted with permission of the Department.

Refer to p. 180 for program details.

Diploma in Music

Admission Requirements

This program is designed to attract individuals who have a strong background in performance on a musical instrument or voice, have been involved in the teaching of music, and who are desirous of obtaining additional academic qualifications.

Applicants will be admitted on the basis of an audition to be held in the Spring of each year. The basic admission requirement is the completion of the Ontario Secondary School Diploma including six Ontario Academic Courses, or the equivalent, with a minimum overall average of 60 percent. Special consideration will be extended to other applicants under Mature Applicant regulations (see Mature and Special Admissions, pp. 28, 48-50.)

Refer to p. 191 for program details.

Certificate in Law Enforcement Studies

Admission Requirements

The basic admission requirement is the completion of the Ontario Secondary School Diploma including six Ontario Academic Courses, or the equivalent, with a minimum overall average of 60 percent. Special consideration will be extended to other applicants under Mature Applicant regulations (see Mature and Special Admissions, pp. 28, 48-50.)

Candidates may be admitted with advanced standing, but must complete at least four credits, including all core courses, for the Certificate at Carleton University.

Refer to p. 178 for program details.

Certificate in French Language Studies

Admission Requirements

The basic admission requirement is the completion of the Ontario Secondary School Diploma including six Ontario Academic Courses, or the equivalent, with a minimum overall average of 60 percent. Special consideration will be extended to other applicants under Mature Applicant regulations (see Mature and Special Admissions, pp. 28, 48-50); and

Candidates are required to take French Placement before entry into the program. Depending on the results of the French Placement procedure, candidates may be required to complete one or more prerequisite French courses before taking any required certificate courses.

Refer to p. 127 for program details.

Certificate in French Translation Studies

The basic admission requirement is the completion of the Ontario Secondary School Diploma including six Ontario Academic Courses, or the equivalent, with a minimum

overall average of 60 percent. Special consideration will be extended to other applicants under Mature Applicant regulations (see Mature and Special Admissions, pp. 28, 48-50).

Candidates are required to take French Placement before entry into the program. Depending on the results of the French Placement procedure, candidates may be required to complete one or more prerequisite French courses before taking any required certificate courses.

Refer to p. 128 for program details.

High School Applicants

Ontario

The basic admission requirement is the completion of the Ontario Secondary School Diploma including six Ontario Academic Courses, or the equivalent, with a minimum overall average of 60 percent. Students who have attained this basic requirement will be considered for admission to First year.

Detailed admission requirements for each undergraduate degree program can be found in chart form on pp. 31-35.

Carleton University utilizes, for admission purposes, the credit system as defined by the Ministry of Education for Ontario. In calculating averages, the weighting factor assigned to a subject will be directly proportional to the credit value of that subject.

Quebec

Students from the Province of Quebec may apply for admission to Carleton University either upon completion of the Secondary V Certificate or after completing work towards the Collegial Diploma. (See Quebec CEGEPs, p. 28.)

Students applying on the basis of high school studies will be considered for admission to the Qualifying-University year as follows:

General Statement

The Quebec Secondary V Certificate, with a minimum 70 percent average and including six college preparatory subjects at the Secondary V level.

Individual Degree Program Requirements

Bachelor of Arts

Secondary V work to include two of: English; a language other than English; mathematics (functions).

Bachelor of Engineering

Secondary V work to include: mathematics (functions); chemistry; physics.

Bachelor of Science

Secondary V work to include: mathematics (functions); two natural sciences (chemistry and physics).

Students who have completed a Grade 12 program will be considered for admission to First year.

Other Canadian Provinces

Applicants to degree programs at Carleton must normally be admissible to a university in their own province.

From the Canadian provinces and territories whose pre-university studies culminate in 12 years of schooling, graduates are considered for direct admission into First year. At the present time, graduates from high schools in

the following provinces are considered for admission, provided a minimum over-all average of 60 percent has been maintained in the final year of schooling:

Alberta and the Northwest Territories
British Columbia and The Yukon
Manitoba
New Brunswick
Newfoundland
Nova Scotia
Prince Edward Island
Saskatchewan

It is recognized that the curriculum of some provinces does not include an introductory course in calculus, or that a final-year mathematics course may have only a few weeks of an introduction to calculus, or that only a few schools in a particular province or territory may offer a calculus course to a selected group of students. In instances where no calculus is presented, and there is a requirement for it in the University program to which the student is admitted, adjustments may have to be made to include Mathematics 69.007★ (Introductory Calculus) as an extra half credit beyond the normal degree program requirements.

It should be noted that for some restricted-enrolment programs, preference may be given to applicants who, along with a high academic standing, have completed an introductory course in calculus.

The United States

1. Applicants who have completed Grade 12 in the United States or in a U.S. overseas school will be considered for admission to First year. The Grade 12 program must include at least four academic units, and a minimum of 16 academic units must have been completed in Grades 9 to 12.

2. A minimum average of B— is required for Pass programs and A for Honours programs. The applicants must be ranked in the first quarter of their class.

3. Applicants must also present a minimum of 550 on the S.A.T. Verbal and a minimum of 550 on the S.A.T. Mathematics, (or a composite score of 1100) of the Scholastic Aptitude and Achievement Tests of the College Entrance Examination Board (C.E.E.B.).

Three achievement tests are required from applicants to the Faculties of Science and Engineering and to the School of Industrial Design, these being: Mathematics and two of Biology, Chemistry or Physics for Science; Mathematics, Chemistry and Physics for Engineering and Industrial Design. The minimum score of 550 in each or a composite score of 1650 is required.

Two achievement tests are required for applicants to the Schools of Architecture and Computer Science (Hardware and Scientific Application areas of specialization). These are: Mathematics and Physics. The minimum score of 550 in each or a composite score of 1100 is required.

4. Applicants failing to meet the foregoing requirements but with otherwise a good academic record may be considered for admission to an appropriate Qualifying-University-year program.

Other High School Systems

Applicants who have completed high school diploma requirements in other than Canadian or American high school systems will be considered for admission at the appropriate level of entry. Individuals from foreign systems of education will be considered for admission to Qualifying-University year only if they are able to present sufficient evidence that

their secondary school background is appropriate to this level of entry with respect to academic content and level of achievement.

Generally speaking, such applicants must meet requirements for admission to a university in their own country.

The following certificates may be accepted to meet admission requirements to the Qualifying-University year:

United Kingdom, West Indies, East and West Africa, Hong Kong: The General Certificate of Education (or equivalent) with satisfactory standing in five subjects at the Ordinary Level (or equivalent), at one sitting.

Note:

Students who achieve at a high level may qualify for a possible reduction in degree requirements. (See *Accelerated Progress*, p. 25.)

The following certificates may be accepted to meet admission requirements to First year:

United Kingdom, West Indies, East and West Africa, Hong Kong: The General Certificate of Education (or the equivalent) with satisfactory standing in five subjects at Ordinary Level and two suitable subjects at Advanced Level, the latter completed at one sitting.

International: The International Baccalaureate.

Special Requirements for Overseas Students

Translation of Documents

The University must be in receipt of all official documents by July 1. Applicants from non-English speaking countries must arrange to submit certified English translations of their academic documents.

Financial Information

The University has no scholarships or financial assistance plans available for incoming foreign students at the undergraduate level.

Transfers from Post-Secondary Institutions

Residence Requirement

In order to qualify for a Bachelor's degree, or a certificate or diploma from Carleton University, an undergraduate student must complete at Carleton University at least the equivalent of the final year of that degree program, or at least four credits for any certificate or diploma. (See p. 37.)

When a faculty of the University further specifies "core" level, and detailed departmental requirements, such as Design Project or Honours Thesis, these must also be fulfilled.

Other Universities

Students applying from other recognized universities may be admitted with advanced standing if they are eligible to continue at the institution from which they wish to transfer.

An applicant who is attending or has attended institutions of post-secondary education must present:

1. *Official Certified Transcripts* of academic records mailed directly to this University by the registrars of the institutions attended;
2. In addition, applicants who have taken only one year of study past the secondary school level may be required to submit an official transcript of high school marks mailed

directly to Carleton University by the principal of the high school concerned.

Credit may be received for courses taken at other recognized degree-granting institutions if:

- (a) courses are relevant to a student's proposed program; and
- (b) the appropriate department recommends that such courses be credited to a student's program. Each application will be evaluated on its own merits.

Students who apply for admission to an undergraduate degree program who already possess an undergraduate degree from either Carleton or another university, are required to complete a minimum of one year's academic work at Carleton University as specified by the department in which the degree is to be taken in order to qualify for another undergraduate degree. (See *Multiple Undergraduate Programs*, p. 24.)

Provisional Admission

Some transfer applicants (those who have attended only one Canadian university or Quebec CEGEP and have demonstrated better than average academic achievement) will automatically be considered for provisional admission. The provisional approval will be given prior to the completion of the student's current year, and will provide a detailed statement of the credits to be granted upon transfer. Admission will be confirmed upon presentation of a final transcript that indicates the successful completion of all courses with suitable standing.

Ontario Colleges of Applied Arts and Technology (CAATs)

Students from Ontario Colleges of Applied Arts and Technology who present a minimum Second-Class-Honours standing will be considered for admission to the University and may receive advanced standing to a maximum of the equivalence of First year. Assessments regarding admission and advanced standing will be based on the following guidelines:

1. Applicants who have achieved an overall Second-Class standing or better, or who have Second-Class standing or better in the last two semesters in a three-year CAAT program, will be considered for admission with advanced standing to a maximum of five credits (equivalent to one year). The advanced standing would be granted according to the appropriateness of the CAAT program, the course concentration and the achievement in relevant courses.
2. Applicants who have achieved an overall Second-Class standing or better, or who have Second-Class standing or better in the last two semesters of a two-year program, will be considered for admission. While such applicants will not normally receive advanced standing, exceptional applicants can receive advanced standing on the recommendation of the appropriate academic department(s).
3. Applicants who have completed two years of a three-year program and who have achieved an overall Second-Class standing or better, or who have Second-Class standing or better in the last two semesters, will be considered for admission. While such applicants will not normally receive advanced standing, exceptional applicants can receive advanced standing on the recommendation of the appropriate academic department(s).
4. Applicants who have completed the first year of a three-year CAAT program with an overall First-Class standing will be considered for admission to First year of an appropriate University program.

5. Graduates of a two-year or a three-year CAAT program or applicants who have completed two years of a three-year CAAT program who do not meet the minimum published requirements but who are presenting *Third-Class standing* may receive special consideration on an individual basis.

Other students presenting an incomplete program normally will not be considered for admission to Carleton University on the basis of that program. Such persons may enquire about possible alternatives if they are desirous of seeking admission to a Carleton University degree program at some future date.

Quebec CEGEPs

Admission Requirements

1. A CEGEP applicant who has completed successfully 12 "General" or pre-university courses with an average of at least 65 percent will be considered for admission to First year, without advanced standing.

2. A CEGEP applicant who has completed successfully more than 12 "General" or pre-university courses with an average of at least 65 percent will be considered for admission with advanced standing based on the number of courses in excess of 12 and not to exceed the equivalent in credits of the First year of the program to which he or she was admitted.

3. A CEGEP applicant from a three-year program who has completed successfully 12 "General" or pre-university courses with an average of at least 65 percent will be considered for admission to First year. He or she may receive advanced standing for courses taken in addition to these 12 provided they correspond to those in the program to which he or she was admitted. The number of advanced standing credits will not exceed those of First year.

4. Normally, an overall average of 65 percent is required for admission to a Pass program while 70 percent is required for an Honours program. The required admission average may be greater for programs where the number of places is limited.

All applicants should note that failures in their CEGEP studies can adversely affect their admissibility.

Subject Requirements

Although specific subject requirements have been kept to a minimum, the following are considered necessary prerequisites for the degree program indicated:

Bachelor of Architecture: mathematics; physics.

Bachelor of Arts: none specified.

Bachelor of Commerce: mathematics.

Bachelor of Computer Science: mathematics; physics required for some options, recommended for all others.

Bachelor of Engineering: mathematics; physics; chemistry.

Bachelor of Industrial Design: mathematics; physics; chemistry.

Bachelor of Journalism: none specified.

Bachelor of Music: none specified.

Bachelor of Public Administration: none specified.

Bachelor of Science: mathematics; two experimental sciences.

Mature and Special Admissions

Mature Applicants

Persons who lack the normal entrance requirements as published in this Calendar may receive consideration for admission under the mature applicants policy. Applicants will normally have been away from full-time studies for a minimum of two calendar years and must be 21 years of age, or over, by December 31 of the year in which they wish to enrol.

Any person who meets the age requirement is eligible to be considered for admission as a mature applicant to either part-time or full-time studies. This category is, however, designed for individuals who do not meet normal admission requirements but who would probably be successful in university studies.

Persons who satisfy the foregoing requirements will normally be admitted to a degree program if they have

- (a) secondary school graduation in an academic program with a 60 percent average; or
- (b) completed, at Carleton, one appropriate credit with a C- or higher standing, in one attempt; or
- (c) other academic or work experience which, in the opinion of the admission committee, indicates a likelihood of success at university.

Only Canadian citizens and permanent residents are considered for admission as mature applicants. Persons who have previously been involved in a university-, or college-level program as full-time students are not normally eligible for consideration as mature applicants, regardless of age. These individuals are assessed for admission on the basis of their most recent academic experience.

Mature applicants are normally considered for admission to the First year of an undergraduate program in Arts, Science or Engineering. Persons seeking admission to the Faculty of Science who do not hold the necessary prerequisites may be required to take Qualifying-University-year courses in addition to the regular program. Those in a similar situation in relation to the Faculty of Engineering will not normally be considered until such time as the necessary prerequisites have been completed.

Mature applicants are not usually considered for entry into Honours programs (e.g. Business) or into Architecture or Industrial Design. If, however, at the end of their First year they meet the requirements for an Honours program, they may apply to transfer to the program of their choice.

Applicants are required to submit proof of age and biographical information with their application for admission.

Special students at Carleton University who meet the age requirement will normally be considered for admission as mature applicants if:

- (a) they have obtained a grade of C- or better in at least one credit (or equivalent), in one attempt; and
- (b) they are eligible to continue as Special students.

Individuals considering admission under the mature applicants category are invited to seek advice at one of the following offices:

The Office of Admissions and Academic Records;
School of Continuing Education.

Special Students

Special students may be admitted to degree study upon indicating, through academic achievement at Carleton, a

reasonable probability of future academic success. However, previous post-secondary studies will be taken into consideration at the time an application for admission is evaluated. Students with previous, unsuccessful post-secondary studies are encouraged to contact the Office of Admissions before attempting to qualify for admission on the basis of Special studies.

Normally, in the Faculty of Arts and the Faculty of Social Sciences, a Special student will be admitted after passing at least four credits with a C- standing or higher in at least two credits or equivalent.

Normally, in the Faculty of Science, a Special student will be admitted after passing at least four *approved* credits with a C- standing or higher in at least two credits or equivalent.

Note:

Students who perform at a higher level may gain admission after fewer credits, i.e. an A- average on two successive credits or a B- average on three successive credits.

Special students seeking admission must meet the requirements within the previous six credits preceding formal application for admission and may not present more than two supplemental or grade-raising examinations in meeting the requirements for admission.

Special students who meet the age requirement for mature applicants will normally be considered on this basis only if they have obtained a grade of C- or better in at least one credit (or equivalent) and are eligible to continue as Special students.

Previous Carleton Students

All former students who had been formally admitted to a degree, certificate or diploma program at the undergraduate level, and who are seeking readmission either to that program or to another program, are governed by differing regulations, depending upon the faculty or school that offers the program.

Please refer to the relevant program section of this Calendar or, if there is no specific entry dealing with readmission in that section, consult the appropriate faculty registrar's office to determine whether or not it is necessary to submit a new application for admission.

Admission Procedures

How to Apply

Prospective students, when requesting an application directly from the University, should provide a complete outline of their academic background.

1. The following applicants must apply through the Ontario Universities' Application Centre (OUAC):

(a) Current Ontario high school students should obtain a preprinted application form from their high school and arrange to have it submitted to the Application Centre.

(b) Overseas applicants must obtain a copy of the OUAC 105F application form designed for them. The Application Centre's address is 90 Woodlawn Road West P.O. Box 1328, Guelph, Ontario, Canada. N1H 7P4.

(c) Other applicants should obtain a common application form from the Office of Admissions and Academic Records, Carleton University, and submit this completed form to the Application Centre.

2. All applicants are required to reveal all previous secondary and post-secondary studies (whether they were suc-

cessfully completed or not) when completing the application for admission.

3. When more than one application choice is directed to Carleton, only the first choice is initially processed. In the event that admission cannot be approved for this program, the applicant will automatically be considered for other choices.

4. Previous Carleton University students do not apply through the Application Centre unless they also wish to be considered for admission to another Ontario university. If they wish to apply solely to Carleton, they request a Carleton application form from the Office of Admissions and Academic Records and submit the completed form directly to that office. If they wish to apply to another Ontario university as well as to Carleton, they should, in addition, request a common application form (OUAC 105), complete and mail it with the application fee to the Centre. Carleton should not be included as a choice on the OUAC 105 form.

Application Deadlines

The following are application dates for the 1989 admission year:

March 1: Candidates whose documents originate outside Canada or the United States.

March 1: Candidates who are studying in Canada on a student visa.

July 1: Applicants for transfer from other universities and colleges in Canada or the United States.

July 1: Candidates applying as mature applicants.

July 1: High school candidates whose documents originate in Canada or the United States.

(Note: Applications for admission may be received after this date, but the University cannot guarantee that all late applications will be processed in time for registration in the academic session requested. Applicants to programs with limited enrolment should note that such programs may be filled by this date.)

August 1: Candidates applying for admission solely on the basis of work completed as Special students at Carleton University.

Documents

Documents submitted in support of an application for admission become the property of the University. In some cases, original documents (for example, General Certificate of Education) may be returned to the applicant.

The University may nullify an admission and revoke a registration if it finds that an applicant for admission or registration has, in the process, provided false or incomplete information.

Early Admission

Offers of early admission will be based on the previous year final and current year interim marks.

For Ontario high school applicants, the earliest date by which offers of admission can be received by candidates for the 1990 admissions cycle is June 15. The onus is on each student who does not receive an offer of early admis-

sion to supply official final marks to the Office of Admissions and Academic Records.

Out-of-province applicants will receive an offer of admission as soon as interim marks are received by the University and the assessment is completed.

Applicants to a restricted enrolment program should note that their acceptance to an offer of admission must be *received* by the Office of Admissions and Academic Records within two weeks from the date the offer was made.

Carleton reserves the right to withdraw offers of admission for failure to complete the school year satisfactorily. In addition, applicants are advised that although they may receive an offer of admission based on interim marks, final marks, when they are received, will become part of the University's admission record.

Summary of Undergraduate Degree Programs

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Architecture

Degree

B. Arch.

Admission Requirements, Qualifying-University Year

As there is no Qualifying-University year in Architecture, students must complete this level of study in high school or by registering in either Qualifying-University year Science or Engineering in an appropriate course pattern. Hence, the admission requirements at this level are those for Qualifying-University year Science or for Qualifying-University year Engineering as stated elsewhere in this chart.

Admission Requirements, First Year

The Ontario Secondary School Diploma or the equivalent, with a minimum average of 65 percent, including six Ontario Academic Courses (OACs), three of which must be Calculus, Algebra and Geometry, and Physics; or the successful completion of Qualifying-University year with an appropriate course pattern.

Arts

Degrees

B.A.

B.A. (Honours)

Admission Requirements, Qualifying-University Year

The Ontario Secondary School Diploma. A 70 percent average must be presented on a minimum of ten Advanced credits in Grades 11 and 12, including two of: English, a language other than English or Mathematics, at the Grade 12 level.

Admission Requirements, First Year

The Ontario Secondary School Diploma or the equivalent, with a minimum average of 60 percent, including six Ontario Academic Courses (OACs); or the successful completion of Qualifying-University year.

For Honours: The Ontario School Diploma including six Ontario Academic Courses, with an average of 65 percent.

For a major in Mathematics, an Ontario Academic Course (OAC) in Calculus and an OAC in Algebra or the equivalent (Mathematics 69.017★ and 69.007★) must be included; for a major in Biology or Psychology they are recommended. Students intending to major in Biology should also present an OAC in Chemistry. Students intending to major in Canadian Studies should present an OAC in French. For a major in Economics, an OAC in Calculus and one in either Algebra and Geometry or in Finite Mathematics are recommended. Students lacking these courses should take Mathematics 69.017★ and 69.007★. These will be counted as credits towards a degree in Economics but may not count for a B.A. Pass or Honours (or Combined Pass or Honours) in Mathematics and Statistics. For all programs, an OAC in English is recommended, although it is not an admission requirement.

Admission requirements are for the 1990-91 year only, and are based on the Ontario High School system. Holding the minimum admission requirements only establishes eligibility for consideration.

Commerce

Degree

B.Com. (Honours)

Admission Requirements, Qualifying-University Year

As there is no Qualifying-University year in Commerce, students must complete this level of study either in high school or by registering in Qualifying-University year Arts in an appropriate course pattern. Hence, the admission requirements at this level are those for Qualifying-University year Arts as stated elsewhere in this chart.

Admission Requirements, First Year

The Ontario Secondary School Diploma or the equivalent, with a minimum average of 65 percent, including at least six Ontario Academic Courses (OACs), two of which must be Calculus, and Algebra and Geometry, or the successful completion of Qualifying-University year with an appropriate course pattern.

Although it is not an admission requirement, an OAC in English is recommended.

Computer Science

Degree

B.C.S. (Honours)

Admission Requirements, Qualifying-University Year

As there is no Qualifying-University year in Computer Science, students must complete this level of study in high school or by registering in an appropriate course pattern in Qualifying-University year Arts, Science or Engineering.

Admission Requirements, First Year

The Ontario Secondary School Diploma or the equivalent, with a minimum average of 65 percent, including at least six Ontario Academic Courses (OACs), including one OAC in Calculus and one OAC in Algebra and Geometry or the successful completion of Qualifying-University year with an appropriate course pattern.

For the Hardware and Scientific Applications options, an OAC in Physics must be included, and it would be advantageous for the Software, and Theory of Computing options.

Engineering

Degree

B. Eng.

Admission Requirements, Qualifying-University Year

The Ontario Secondary School Diploma. A 70 percent average must be presented on a minimum of ten Advanced credits at Grades 11 and 12 including an appropriate preparation in Chemistry, Physics and Grade 12 Mathematics.

Admission Requirements, First Year

The Ontario Secondary School Diploma or the equivalent, with a minimum average of 65 percent, including at least six Ontario Academic Courses (OACs), which must include Calculus, Algebra and Geometry, Chemistry, and Physics, with a minimum average of 65 percent in these core courses; or the successful completion of Qualifying-University year with an appropriate course pattern.

Although it is not an admission requirement, at least one OAC in either English or français is recommended.

Industrial Design

Degree

B.I.D.

Admission Requirements, Qualifying-University Year

As there is no Qualifying-University year in Industrial Design, students must complete this level of study in high school or by registering in either Qualifying-University year Science or Engineering in an appropriate course pattern. Hence, the admission requirements at this level are those for Qualifying-University year Science or for Qualifying-University year Engineering as stated elsewhere in this chart.

Admission Requirements, First Year

The Ontario Secondary School Diploma or the equivalent, with a minimum average of 65 percent, including six Ontario Academic Courses (OACs), which must include Physics, Chemistry, Algebra and Geometry, and Calculus; or the successful completion of Qualifying-University year with an appropriate course pattern.

Although it is not an admission requirement, an OAC in English is strongly recommended.

Journalism

Degree

B.J. (Honours)

Admission Requirements, Qualifying-University Year

As there is no Qualifying-University year in Journalism, students must complete this level of study either in high school or by registering in Qualifying-University year Arts in an appropriate course pattern. Hence, the admission requirements at this level are those for Qualifying-University year Arts as stated elsewhere in this chart.

Admission Requirements, First Year

The Ontario Secondary School Diploma or the equivalent, with a minimum average of 65 percent, including six Ontario Academic Courses (OACs) or the successful completion of Qualifying-University year.

Although it is not an admission requirement, an OAC in English is recommended.

Music

Degree

B.Mus. (Honours)

Admission Requirements, Qualifying-University Year

As there is no Qualifying-University year in Music, students must complete this level of study either in high school or by registering in Qualifying-University year Arts. Hence, the admission requirements at this level are those for Qualifying-University year Arts as stated elsewhere in this chart.

Admission Requirements, First Year

The Ontario Secondary School Diploma or the equivalent, with a minimum average of 65 percent, including six Ontario Academic Courses (OACs); or the successful completion of Qualifying-University year.

Although it is not an admission requirement, an OAC in English is recommended.

Public Administration

Degree

B.P.A. (Honours)

Admission Requirements, Qualifying-University Year

As there is no Qualifying-University year in Public Administration, students must complete this level of study either in high school or by registering in Qualifying-University year Arts. Hence, the admission requirements at this level are those for Qualifying-University year Arts as stated elsewhere in this chart.

Admission Requirements, First Year

The Ontario Secondary School Diploma or the equivalent, with a minimum average of 65 percent, including six Ontario Academic Courses (OACs); or the successful completion of Qualifying-University year.

Although it is not an admission requirement, an OAC in English is recommended.

Science

Degrees

B.Sc.

B.Sc. (Honours)

Admission Requirements, Qualifying-University Year

The Ontario Secondary School Diploma. A 70 percent average must be presented on a minimum of ten Advanced Phase credits at Grades 11 and 12, including an appropriate preparation in Chemistry, Physics and Grade 12 Mathematics.

Admissions Requirements, First Year
Major Program

The Ontario Secondary School Diploma or the equivalent, with a minimum average of 60 percent, including six Ontario Academic Courses (OACs), including an OAC in Calculus, one OAC in Algebra and Geometry, and two OACs in the experimental Sciences; or the successful completion of Qualifying-University year with an appropriate course pattern.

Honours Program

A minimum average of 65 percent on the Ontario Secondary School Diploma with the same course requirements as cited above; or successful completion of Qualifying-University year with an appropriate course pattern.

For Honours in Psychology, an OAC in English is recommended.

Requirements

All students attending the University are required to register in their courses with the registrar's office of the appropriate jurisdiction at the time designated for the session, and to inform that office of any changes in registration.

Course selection and course change activities will normally be carried out using the University's Touchtone Voice Response Registration system. The phone number for this system is 564-4455.

Students who do not complete their registration until the Late Registration Period are assessed a Late Registration Charge. (See p. 43.)

A student who forfeits undergraduate status or who is rusticated from a Degree, Certificate or Diploma program, is ineligible to register as a Special Student for one calendar year. At the end of that period, and prior to any registration as a Special Student, the student should seek advice from the appropriate Registrar's Office, clarifying whether any courses taken as a Special Student may assist to gain re-admission to a program and whether any credit could be expected to be retained from such registration.

A student's registration shall not be considered to be complete until arrangements have been made for the discharge of all financial responsibilities to the University in accordance with the University policies.

No student will be permitted to register until all outstanding accounts due to the University have been paid. (See *Delinquent Accounts*, p. 45.)

The University may nullify an admission and revoke a registration if it finds that an applicant for admission or registration has, in the process, provided false or incomplete information.

Health Service Requirement:

See p. 46.

Course Selection

Students proceeding to a Degree, Diploma or Certificate must select their courses according to the requirements set by their faculty or school, and major department.

Students planning to undertake professional training beyond their undergraduate studies should ensure that their programs meet the requirements for admission to their intended school, faculty or profession.

Cross-Referenced Courses

Some courses appear in the Calendar more than once. Some students may have flexibility to take these cross-referenced courses in any department under which the course is listed. Other students may not have that choice. All students are advised to consult with their academic adviser as to their appropriate course of action for their particular program of study.

The departmental designation may not be changed after the last date for withdrawal in the appropriate term or session.

Challenge for Credit

Challenge for Credit is a Carleton University policy that enables students to gain undergraduate academic credit for their own learning and experience outside the University.

Challenge for Credit is available only to students formally admitted to and registered in a program leading to a Degree, Diploma, or Certificate.

Special students are not eligible to challenge for credit.

This policy gives the student the opportunity to be examined on, and receive credit for, a recognized Carleton course without meeting the normal requirements of registration, attendance, and instruction. Students wishing to Challenge for Credit should enquire at their faculty registrar's office, with documentation to support the challenge. If the academic department, after an interview, is satisfied that the student has adequate experience and learning related to the course in question, it accepts the challenge and sets an appropriate examination. If the student is successful in the examination, the course is credited to his or her academic record.

Not all courses offered at the University are open to Challenge for Credit.

See also *Fees*, p. 44.

Transfer of Credit for Courses Completed at Other Universities

1. Prior to Admission

At the time a student is considered for admission, credit may be granted for individual courses successfully completed at other recognized, degree-granting institutions, if:

- (a) the individual courses are relevant to a student's proposed program; and
- (b) the appropriate academic department recommends such action.

Each application is evaluated on its own merits.

2. Subsequent to Admission

Students who have been formally admitted to a Carleton Undergraduate Degree, Certificate or Diploma program may take courses at other universities on Letters of Permission and have the credits transferred to their Carleton programs, provided they obtain formal approval prior to commencing each course.

For faculty procedures for obtaining a Letter of Permission, see the appropriate section of this Calendar or consult the office of the appropriate faculty registrar.

Auditing Courses

A student may register to audit a course (i.e. attend without receiving credit), in addition to those courses being taken for credit. Although audited courses receive no academic credit, they are counted as part of the total course load.

Full-time students may register to audit a course without an additional fee; all others must pay the regular course fee.

Students are not permitted to audit courses with restricted enrolment.

The deadline for change from audit to credit or credit to audit is the last day for course changes.

Course Changes

Changes of course (including changes of status from credit to audit or audit to credit) or changes of section within a course must be made by the dates designated in the Calendar under the Academic Year.

Program Changes

Students wishing to change faculty or school, or to change majors, or to change between major and honours, must apply to make such changes. Applications should be made at the registrar's office of the faculty in which the student is registered, after consultation with the faculty, school or departments concerned.

The deadlines for application for degree program changes are:

Fall/Winter Session

1. Fall term: August 1.
2. Winter term: January 1.

Withdrawal

Students who are withdrawing from a course or courses, or entirely from the University, must notify their appropriate faculty registrar's office. This is normally done via the Touchtone Voice Response Registration system.

The official date of withdrawal is the date on which the notification is received. Fee adjustments for students withdrawing will be calculated as of that date.

Students *must* withdraw from a course or courses, or from the University, on or before the appropriate last date for withdrawal as shown in the calendar for the Academic Year. (See pp. 8-9.) The withdrawal, along with the date of withdrawal, will be entered on the student's transcript as *Wdn*, which is defined as "Withdrawn in good standing. No academic credit."

It is not possible to withdraw from a course or courses or from the University after the appropriate designated last date for withdrawal.

For clarification of the effect of withdrawal on fees, see p. 44.

Notes:

1. The responsibility for taking all steps necessary for withdrawal is entirely that of the student. Ceasing to attend classes, or informing an instructor of intent to withdraw *does not* constitute withdrawal.
2. Withdrawal may affect the student's promotion status as prescribed by regulations of the various faculties and schools. Students are advised to consult their faculty registrar's office for information and guidance.
3. A student who withdraws from a course retains no academic credit for any part of that course.

Residence Requirement

In order to qualify for a Degree from Carleton University, a student must complete a minimum number of credits at Carleton University. For the specific number and type of courses required, refer to the appropriate faculty section of this Calendar.

To obtain an undergraduate Certificate or Diploma from Carleton University, students must present a minimum of four credits taken at Carleton, including all core courses.

University of Ottawa Exchange Agreement

Carleton undergraduate students may register to take courses at the University of Ottawa to be credited to their Carleton degree. The following regulations apply:

1. Students must be registered in a degree program at Carleton **and** must have completed the requirements for the First year of their program; and be in good standing.
2. Only courses to be credited as part of degree requirements at Carleton may be taken under the terms of the exchange.
3. At any time, the cumulative total of courses taken by the student at Carleton and counting toward the degree must be greater than the total number of courses taken and proposed at the University of Ottawa and counting toward the degree.
4. Courses under the Exchange Agreement shall not count towards Residence Requirements at Carleton University.

Applications to participate in the Exchange Agreement are available in faculty registrar's offices. Please consult your faculty registrar's office about deadlines and procedures. Students should note that space in courses may be limited and therefore applications should be filed as early as possible.

Other Exchange Agreements

Undergraduate students may be eligible to take advantage of other exchange agreements with universities throughout the world. For details, students should consult with their faculty registrar's office and the Paterson Centre for International Programs a year in advance of the proposed exchange.

Addresses

Incorrect address information will delay the receipt of awards, examination results and notification of changes in academic status. Students must notify their faculty registrar's office immediately of any change in:

- (a) permanent or home address (used for final grades and registration information);
- (b) local address (used for all mail during the academic session);
- (c) telephone number for permanent address and for local address;
- (d) name.

General

The Senate may at any time require a student to withdraw from the University if his or her conduct, attendance, work or progress is deemed unsatisfactory.

Evaluation

To gain standing in a course, a student must meet the course requirements for attendance, term work and examinations. Instructors will inform their classes in writing before the last date for course change of the elements that will contribute to the final grade and their weighting, including attendance, class participation, essays, tests, laboratories or studio-workshops, or other course-related work assignments, and final examinations. In all undergraduate courses with written final examinations, instructors will also inform their classes that supplemental and grade-raising examinations are available to undergraduate students who have passed the course, or have been awarded a grade of *F*, or under conditions defined by the faculties, and of the method of computing a grade revised by these examinations. Students enrolled in the Bachelor of Engineering program are not eligible to write grade-raising examinations.

Supplemental and grade-raising examinations will not normally be available in courses without written final examinations.

Standing in Courses

Standing in courses will be determined by departments. Standing in courses will be shown by alphabetical grades. The system of grades used, with corresponding grade points, is as follows:

A+	12	B+	9
A	11	B	8
A-	10	B-	7
C+	6	D+	3
C	5	D	2
C-	4	D-	1

Grade points indicated above are for courses of one credit in value. Where the course credit is greater or less than one credit, the grade points are adjusted proportionately.

The following percentage equivalents are published solely to assist other institutions in interpreting letter grades. Students are advised that these equivalents have no internal application.

A+	90-100	B+	77-79
A	85- 89	B	73-76
A-	80- 84	B-	70-72
C+	67- 69	D+	57-59
C	63- 66	D	53-56
C-	60- 62	D-	50-52

Other notations are as follows:

Aeg

Pass standing granted under special circumstances. Aegrotat standing is granted only by a faculty committee, in response to a student's application. (See Deferred Final Examinations, p. 39.)

Aud

Indicates course is not being taken for academic credit.

F

Failure. No academic credit.

FNS

Failure without access to supplementals because of incomplete term work or unacceptably low standing. No academic credit.

Abs

Absent from final examination. No supplementals. No academic credit. *Abs* is usually equated to failure.

Wdn

Withdrawn in good standing. No academic credit.

Def

Indicates deferral of final grade has been approved by a faculty committee. (See Deferred Final Examinations, p. 39.)

IP

In Progress.

Ch

Credit granted under challenge for credit policy.

Sat

Satisfactory.

Uns

Unsatisfactory.

Promotion and Probation

The conditions under which undergraduate students may be promoted, and placed on or relieved of probation, are shown in the Calendar entries for the faculties and schools.

Program Year

Progress through degree studies is normally measured in terms of program years. The program year represents the accumulation of the number of credits normally taken in a Fall/Winter session of full-time study in the program in question. In addition, in some jurisdictions, program year implies the accumulation of a certain pattern of credits.

Accelerated Progress

Qualifying-University-year students who perform at an above-average level may achieve a reduction in the number of credits required to graduate, under the "Accelerated Progress" policy. Detailed requirements are shown in the Calendar entries for faculties.

Graduation Requirements

In order for a student to receive his or her degree, he or she must fulfil:

1. all the requirements of the department(s), school or institute in which he or she is taking the degree;

2. all faculty regulations;
3. all University regulations;
4. all financial obligations to the University.

The student is responsible for meeting graduation requirements. Acceptance of a registration does not grant exemption from any regulation.

Students who wish to be considered for graduation must apply at their faculty registrar's office by the following deadlines:

Winter Graduation (February): December 1

Spring Graduation (June): February 1

Fall Graduation (November): September 1

Examinations

Students writing tests and examinations should be aware of the rules governing examination conduct, which are printed on the cover of official examination booklets.

It may be necessary to schedule mid-year and final examinations for classes held in the evening during the day and vice versa.

All tests and examinations, except laboratory examinations, oral and slide tests and other particular tests, are subject to the following rules:

1. Tests or examinations given in class may not exceed the time allotted for the class.
2. Final examinations in the Summer session will be held in official examination periods.
3. In courses numbered below the 200 level, mid-year and final examinations will be held in the official examination periods.
4. In courses numbered below the 400 level, no tests or examinations may be held during the last two weeks of classes in the Fall or Winter term of the Fall/Winter Session, between the end of classes in the Winter term and the beginning of formally scheduled examinations, or in the last two weeks of classes of the Summer session.
5. In courses below the 400 level, take-home examinations may not be assigned before the last day of classes and are due on the last day of the official examination period.
6. In courses at the 400 level, arrangements for unscheduled examinations are at the instructor's discretion but must be announced at least three weeks before the examinations.

Deferred Final Examinations

Students who are unable to write a final examination because of illness or other circumstances beyond their control, or whose performance on the examination has been impaired by such circumstances, may, on application, be granted permission to write a deferred final examination. Such applications must:

1. be made in writing to the appropriate faculty registrar's office within a week after the original final examination (students in the Faculties of Arts and Social Sciences see p. 64); and
2. be fully supported in cases of illness by a medical certificate or by appropriate documents in other cases.

Aegrotat standing will be considered for applicants for deferred finals but will be granted only if term work has been of high quality. A student granted aegrotat standing may apply to write a deferred final examination. Deferred final examinations are written at the time of the supplemental examinations for the session concerned.

See also Note a, below.

Supplemental Examinations

Supplemental examinations are available in all undergraduate courses with written final examinations. Undergraduate students may, on application, write supplemental examinations in courses graded F, under conditions defined by the faculties.

Supplementals must be written at the next supplemental examination period, and if a supplemental is failed, the student must repeat the course before writing another examination in it.

Students may apply to write supplemental examinations outside of Ottawa.

See also Note a, below.

Grade-Raising Examinations

Grade-raising examinations are available in all undergraduate courses with written final examinations. However, students enrolled in the Bachelor of Engineering program are not eligible to write grade-raising examinations. All other undergraduate students may, on application, write grade-raising examinations in courses already passed, under conditions defined by the faculties.

The grade awarded subsequent to a grade-raising examination supersedes the original final grade. A grade-raising examination in a course can be written only once, and at the next scheduled supplemental examination period.

See also Note a, below.

Notes

(a) In the following half-credit courses in Mathematics and Statistics, where the course is offered in two successive terms, the Supplemental/Grade-Raising/Deferred Final Examination for the first course will be taken as the second course Final Examination, except where such a delay might delay graduation in the Fall:

Mathematics 69.006★, 69.007★, 69.107★, 69.107★, 69.109★, 69.117★, 69.119★, 69.207★, 69.208★, 69.217★, 69.257★, and 69.259★.

(b) In courses offered by the Faculty of Engineering, Supplemental Examinations in Fall term courses at the First, Second and Third-year levels are scheduled for the August Supplemental period; Supplemental Examinations in Fall term courses at the Fourth-year level are scheduled by the Faculty of Engineering Registrar's Office for the month of May.

Review of Grades

Students are entitled to review of a final grade. Those wishing to receive such a review should enquire at their faculty registrar's office, after which they may wish to make a formal application for this review. Applications must be filed with the appropriate faculty registrar's office within 14 days of the official release of grades for the term.

Note:

The review may lower the grade.

Requests for review are dealt with by the departmental chairpersons in consultation with members of the department.

The charge for each review (see p. 44) is refundable if the grade is raised. Students awaiting the outcome of a review must still apply for any supplemental examination by the prescribed deadline.

Release of Grades

A Statement of Marks is mailed to each student as soon as the grades are available after the end of the Fall and Winter terms of the Fall/Winter session and after the end of the Summer session. A Statement of Marks is mailed to every applicable student as soon as possible after each supplemental examination period.

Students may obtain a copy of their official transcript by completing a copy of the "Request for Academic Transcript" form which is available in the Student Liaison Office, Room 315, Administration Building. Transcripts required for professional and graduate schools should be ordered well in advance of any deadline set by these institutions.

Students are advised that no Statement of Marks or official transcripts will be released by the University until all outstanding accounts due have been paid. (See Delinquent Accounts, p. 45.)

Instructional Offences

The Senate of the University has enacted the following regulations for instructional offences:

Any student commits an instructional offence who:

1. cheats on an examination, test, or graded assignment by obtaining or producing an answer by deceit, fraud or trickery, or by some act contrary to the rules of the examination;
2. contravenes the regulations published at an examination or which are displayed on the reverse side of a properly authorized examination booklet;
3. commits an act of plagiarism (which for the purpose of this regulation shall mean to use and pass off as one's own idea or product work of another without expressly giving credit to another);
4. disrupts a class or other period of instruction if he or she:
 - (a) is a registered member of the class or period of instruction;
 - (b) is warned to discontinue any act or behaviour reasonably judged by the instructor of the course or period of instruction to be detrimental to the class, and having ignored such warning is ordered by the instructor to leave and refuses to leave.

5. Any student found in violation of these regulations may be:

- (a) expelled;
 - (b) suspended from all studies at the University;
 - (c) suspended from full-time studies;
- and/or
- (d) awarded a reprimand;
 - (e) refused permission to continue or to register in a specific degree program but subject to having met all academic requirements shall be permitted to register and continue in some other program;
 - (f) placed on academic probation;
 - (g) awarded an *FNS*, a *Fail*, or *Abs* in a course or examination.

Allegations of instructional offence may be investigated by instructors and/or departmental chairpersons and, in all cases, will be reported to the faculty Dean. The Dean will promptly advise, in writing, the student and the University Ombudsman of the allegation and of the student's rights. The Dean will review the allegation and, if not resolved at that level, the allegation becomes subject to final disposition by a tribunal appointed by the Senate. Information about procedure governing tribunals is available from the Clerk of the Senate, Room 607, Administration Building.

The Senate of the University has approved in principle the notation "Mention: français," which a student may earn within a Major or Honours degree under certain prescribed conditions.

In essence, the student must demonstrate the capability of working in French within the discipline of his or her degree, and must also demonstrate knowledge of the history and culture of French Canada. The specific credit requirements (three for a Major degree and four for an Honours degree) will be developed by individual departments within the University according to the Senate's guidelines, and approved by the Senate. Students wishing to register for the notation must first demonstrate capability of working in French at the First-year level. Students should refer to their departments for specific information about what arrangements may be available.

The academic dress of Carleton University is a compromise between the style of hoods outlined in the American Inter-collegiate Code and the dress of the ancient foundations of Britain and America. All three hoods, Bachelor's, Master's, and Doctor's, are of the simple or Oxford shape. The Bachelor's hood is made of black stuff, the Master's and the Doctor's of black silk, and all are lined with silver silk with two chevrons, one of red and one of black. From Bachelor's to Doctor's the hoods are progressively longer and opened to show more and more of the lining.

The velvet border of the hoods, 5 cm. in width for Bachelor's, 7.5 cm. for Master's and 8 cm. for Doctor's, denotes the degree granted, according to the following colour combinations: *Architecture*, cerise; *Arts*, white; *Commerce*, camel brown; *Computer Science*, royal blue; *Engineering*, orange; *Industrial Design*, dark cardinal; *Journalism*, white with a black cord sewn slightly in from the lower border; *Management Studies*, camel brown with a black cord sewn slightly in from the lower border; *Music*, Venetian pink; *Public Administration*, peacock blue; *Science*, golden yellow; *Social Work*, cream; *Doctor of Philosophy*, purple.

The Bachelor's gown, to be worn with the above hoods, is of full length, made of black stuff, with a gathered yoke behind, and long open-fronted sleeves. The Master's gown is of full style, made of black silk or rayon, with full gathered yoke behind, and closed sleeves with an opening at the elbows. The Doctoral gown is the same style as the Master's, made of fine royal blue cloth with facings of a light blue silk.

The gown of the Honorary Doctor of Laws, Literature, Science and Engineering is a blue robe with bell-shaped sleeves, made of fine royal blue cloth with facings and sleeves in light blue silk. The hood is made of the same material as the gown, has the same lining as that for the degrees granted by examination, and is bordered with dark mauve for the degree of Doctor of Laws, vibrant blue for the degree of Doctor of Literature, red for the degree of Doctor of Science and orange for the degree of Doctor of Engineering.

Fees

General Information

1. This Calendar is published several months in advance of the academic year. The University reserves the right to change fees and refund policies without notice. At the time of publication, legislation is pending on a Federal Goods and Services Tax. This may be applicable to some of the fees and charges published in this Calendar if, and when, it becomes effective.

2. Tuition fees include laboratory and survey camp fees, where applicable. In addition, *compulsory miscellaneous fees* (see below) are also assessed.

Composite Tuition and Compulsory Miscellaneous Fees, 1989-90 Fall/Winter Session

Canadian Citizens, Permanent Residents and Foreign Students Exempt from Visa Regulations (see below)

Full-Time (four or more full-credit courses)

Qualifying-University Year	\$2,222.75
Arts, Public Administration, Journalism, Music, Science, Computer Science, Specials	\$1,767.75
Engineering	\$1,911.75
Commerce	\$1,782.75
Architecture and Industrial Design	\$1,896.75

Part-Time (per course)

All part-time students <i>excluding</i> the Faculty of Engineering and Commerce	\$ 340.24
All part-time students in the Faculty of Engineering and in Commerce	\$ 343.24

Visa Students

(a) Qualifying-University Year	
Full-Time (four or more full-credit courses)	\$2,222.75

(b) Type A Programs: Arts, Public Administration, Music, Science, Computer Science and Specials

Full-Time (four or more full-credit courses)	\$5,971.75
Part-time (per course)	\$1,188.24

(c) Type A Programs: Commerce

Full-Time (four or more full-credit courses)	\$5,986.75
Part-Time (per course)	\$1,191.24

(d) Type B Programs: Architecture, Industrial Design and Specials

Full-Time (four or more full-credit courses)	\$9,576.75
Part-Time (per course)	\$1,911.24

(e) Type B Programs: Engineering

Full-Time (four or more full-credit courses)	\$9,591.75
Part-Time (per course)	\$1,194.24

Note:

The foregoing fees include compulsory miscellaneous fees, as follows:

Full-time students in Arts, Public Administration, Journalism, Music, Science, Computer Science, Architecture, Industrial Design, and Specials in these faculties

Student Accident/Sickness	\$ 25.35
Challenge Fund	\$ 15.00

Student's Association	\$ 60.50	
Athletics	102.75	
Health Services	27.15	
University Centre	20.00	\$210.40
Total		\$250.75

Full-time students in the Faculty of Engineering, and in Commerce

Students Accident/Sickness	\$ 25.35	
Challenge Fund	\$15.00	
Students' Association	\$ 75.50	
Athletics	\$ 102.75	
Health Services	27.15	
University Centre	20.00	\$225.40
Total		\$265.75

Part-time (per course) in Arts, Public Administration, Journalism, Music, Science, Computer Science, Architecture, Industrial Design and Specials in these faculties

Challenge Fund	\$ 3.74	
Students' Association	\$12.10	
Athletics	20.54	
Health Services	4.86	
University Centre	4.00	\$ 44.50
Total		\$ 45.24

Part-Time (per course) in the Faculty of Engineering, and in Commerce

Challenge Fund	\$ 3.74	
Students' Association	\$ 15.10	
Athletics	20.54	
Health Services	4.86	
University Centre	4.00	\$ 44.50
Total		\$ 48.24

Co-operative Program, Computer Science

Computer Science Co-operative program students enrolled in two or more credits a study term will be assessed one-half the full-time Computer Science composite tuition fee (excluding the insurance fee, which will be assessed at the full rate) and an additional tuition amount of \$15 per study term. Co-operative program students registered in fewer than 2.0 credits a study term will be assessed the part-time Computer Science composite tuition and an additional amount of \$6.00 per full-credit. The Co-operative work term will be assessed a charge of \$235.00.

Undergraduate Student Fees, Notes

(a) Half-credit course fees are assessed at one half the full-credit course amounts.

(b) Re-registration in an Honours paper or thesis is assessed fees equivalent to the prevailing half-course fee.

(c) Students transferring from a Fall-term half-credit course to a Winter-term half-credit course will be given credit for the unexpired portion of the Fall-term half-credit course and charged full fee for the Winter-term half-credit course.

(d) The student accident/sickness insurance coverage is based on a one-year period from October 1 to September

30. The insurance fee of \$25.35 is payable once a year, at registration in September.

(e) **The Carleton University Challenge Fund** is the largest fund-raising campaign in Carleton's history. In a referendum in March, 1987 Carleton University students voted in favour of an annual student donation for five years to support the Challenge Fund. The donation for full-time students is \$15.00 per academic session. The donation for part-time students is \$3.74 per full-credit course. A donation receipt will be produced and distributed with the tuition receipt in February. Refunds for students who do not wish to support the Challenge Fund will be available following each registration at dates and times to be announced in the student newspaper, *The Charlatan*.

Exemptions for Foreign Students

Subject to approval by the Office of Admissions and Academic Records, the following categories of foreign undergraduate students are exempt from the foreign students' fee indicated above and will instead be assessed the regular tuition fee:

1. Legal dependents of Canadian citizens or Permanent Residents where the dependent status has been fully documented and has been established a minimum of three years prior to the student's application for exemption.
2. Persons who have been recognized as a Convention Refugee within the meaning of the Immigration Act or persons and their dependents who have applied for Convention Refugee Status prior to January 1, 1989.
3. Persons or dependents of persons admitted to and remaining in Canada under diplomatic visas or under the Visiting Forces Act.
4. Persons or spouses or dependents of persons admitted to and remaining in Canada under Clause 10 (c) of the Immigration Act for the purpose of engaging in employment (other than graduate teaching and research assistants).
5. Persons or dependents of persons, admitted to Canada under clause 10 (a) or (b) of the Immigration Act who are sponsored and financially assisted by agencies such as the Canadian International Development Agency, the International Development Research Centre, the World Bank, the Caribbean Development Bank and the African Development Bank and by various aid programs of the United Nations and its agencies.
6. Persons participating in a cultural exchange agreement between the government of another country or in a formal agreement between Carleton University and a post-secondary institution in another country.

Undergraduate students who believe they qualify for exemption under one of the foregoing categories must submit documentation to support their claim to the Records Office, Room 405, Administration building. Until a request for exemption has been requested and approved, students will be assessed the Visa Student fees.

Tuition Fees: Senior Citizens

All persons 60 years of age and over as of the last day for late registration may register in degree-credit courses and have their tuition fees waived. The charge to these students is a \$5.00 per session registration fee, plus the Challenge

Fund and Accident/Sickness Charge (applicable to full-time studies).

Late Registration Charges

The late registration charge is assessed according to the date registration is completed and is non-refundable. For the last day for late registration in any session or term, see *The Academic Year*, pp. 8-9.

Full-time Students	\$67.50
Part-time Students, per full-credit course	\$13.50

Method of Fee Payments

Fees may be paid in accordance with either of the following plans.

1. Payment in full at the time of registration.
2. Payment in two installments:
 - (a) At registration, one half of the total tuition fee plus all miscellaneous fees plus a non-refundable deferred payment charge of \$3.15 per half-course credit (\$31.50 for four or more course credits);
 - (b) at or before January 15, the remaining half of the total tuition fee.

Scholarships, bursaries, and loans administered by the University shall be applied first to fees, provided this is not contrary to the terms of the award.

Personal cheques will be accepted for payment of accounts but the University reserves the right to cancel the use of this method by any student if it is abused. A service charge of \$10.50 will be made for each cheque returned to the University as non-negotiable for any reason. Students are requested to have their own cheque forms available when making payments.

Miscellaneous Charges

1. Transcripts

Each student will be eligible for one free transcript at graduation. All other transcript requests will be processed after payment is made in advance at the Business Office, at the rate of \$3.50 per transcript. Mailing address: Transcript Clerk, Room 405, Administration Building, Carleton University, Ottawa, K1S 5B6. (Enclose \$3.50 per transcript.)

An extra charge per transcript will be added to offset the cost of faxing transcripts at the request of students as follows:

Ontario	\$3.00
Rest of Canada	5.00
Outside Canada	8.00

2. Letters of Permission

A charge of \$16.00 per course, (regardless of credit value) to a maximum of \$80.00 per academic session, will be assessed on each request for a Letter of Permission. This charge is payable in advance at the Business Office.

3. Examination Charges

(a) *Written at Carleton:* A charge of \$23.00 per paper applies for supplemental and grade-raising examinations, and for requests for grade reviews. There is no charge for deferred final examinations.

(b) *Written Off-Campus:* In addition to the charge in (a) above, a charge of \$23.00 applies for each paper written at a location other than at Carleton.

(c) Examination charges are non-refundable. The grade review charge will be refunded if the grade is raised.

4. Challenge for Credit

A \$63.00 non-refundable charge applies for each challenge for credit. (See also p. 36.)

5. Certificates for Income Tax Purposes

Tuition Certificates and Certificates of Attendance for income tax purposes will be available from the Business Office by the end of February to all students who have paid their accounts in full. Students will be charged \$4.00 in advance for each duplicate/replacement tax certificate requested.

6. Replacement Student Identification Cards

A charge of \$6.00 will be assessed for the replacement of student identification cards, payable at the time of replacement. Returning students will be required to pay this amount before obtaining a new card at registration in the event that the student's card is not available for validation. The identification card remains the property of Carleton University and it may be cancelled or withheld at the discretion of the University.

7. Replacement of Graduation Diplomas

A charge of \$25.00, payable in advance, will be assessed for the issuing of replacement Diplomas. Mailing address: Records/Operations, Room 405, Administration Building, Carleton University, Ottawa, K1S 5B6.

Withdrawal and Fee Adjustment

See also p. 37.

The composite fee for full-time students is a charge for four credits or more. No charge is made for the fifth or any additional credits; conversely, no fee adjustment will arise as a result of withdrawal from a course by a full-time student unless the change alters his or her status from full-time to part-time.

Students who withdraw from a course, or from the University, are required to do so by the touchtone telephone system or to notify their Faculty Registrar in writing. A fee adjustment will be calculated according to the effective date of the withdrawal/change.

A fee adjustment may be made for withdrawals before the last date for late registration in the Fall term. This adjustment will amount to the composite fee less a registration charge calculated at the rate of \$7.00 per half-credit for part-time students and \$70.00 for full-time students. After the last date for late registration, the tuition portion of the composite fee, less the registration charge, is amortized over the period from the first day of classes to the last date for withdrawal with partial refund credit.

A detailed schedule of withdrawal credits is available at the Business Office. As an example, the table below is an illustration of how this schedule applies to a student registered in the Fall/Winter session in Arts. (1989-90 fees are used in this example.)

The amount to be pro-rated is spread over the period from the first day of classes to the last day for withdrawal with partial refund credit. In the case of the following example any student who withdraws after the last day for late registration will receive a withdrawal credit of \$1,449.50 (\$281.00 part-time, per full-credit course) less approximately \$13.00 per day (\$3.00 per day part-time, per full-credit course) for each day the University is normally open as determined by the effective date of the withdrawal/change.

It is possible to withdraw or change from full-time to part-time status in January and still owe some tuition if only the first instalment amount was paid at the time of registration.

Note that miscellaneous fees are not refundable after the last day for late registration. Late registration or deferred payment fees are not refundable.

The appropriate withdrawal credit will be applied to the student's account and any amounts due at that time will be offset before a cash refund is prepared.

Following are the last dates for withdrawal with partial refund credit. Application for withdrawal and fee adjustment may not be considered if received after these dates:

1990-91 Fall/Winter Session

November 9, 1990, Fall-term course
February 15, 1991, Fall/Winter session course or withdrawal from full-time status
March 15, 1991, Winter-term course

1991 Summer Session

June 14, Evening division First-term half-credit course
July 19, Evening division full-credit course
July 26, Day division and Evening division Second-term half-credit course

	Full-Time (4 or more credits)	Part-Time (per full-credit course)
Original Assessment	\$1,767.75	\$340.24
Less: Registration Charge	\$ 67.50	\$ 13.50
Credit up to last day for Late Registration (September 21, 1990)	\$1,700.25	\$326.74
Less: Miscellaneous Fees (after September 21, 1990)	\$ 250.75	\$ 45.24
Amount to be pro-rated over period September 7, 1990 February 15, 1991 (last day for withdrawal for Fall/Winter session full-credit courses with partial refund credit)	\$1,449.50	\$281.50

Overdue Accounts

Fees are due and payable at the time of registration. Students may, however, be permitted to select a payment program, in which case the last payment due-date is January 15. Should a student fail to complete the payments as arranged at registration, or fail to make satisfactory arrangements for the discharge of fees or other outstanding amounts by the last payment due-date, the University reserves the right to cancel the student's registration. All charges and outstanding fees accrued to the date of cancellation will remain due and payable on the student's account.

Delinquent Accounts

Registration shall not be complete until a satisfactory arrangement has been made for the payment of fees, and may be cancelled should the student fail to meet these arrangements.

If students owe the University any money at the end of an academic session their accounts become delinquent. Students with delinquent accounts will not receive examination results, are not permitted to receive transcripts, and will not be permitted to register again until all monies owing have been paid in full by cash or certified cheque.

Locker Rentals

Rent is charged for the use of locker space during the academic year. Lockers are allocated on a first-come first-served basis and may be shared. Locks will be removed from lockers occupied by unauthorized persons and the contents turned over to the Parking Office. No refunds or exchanges will be made.

Lockers must be vacated by May 1 for the Fall/Winter session and by August 20 for the Summer session, after which they will be cleared and the contents treated as abandoned and will be disposed of by the University without further notice.

Parking Office: 788-3623.

Parking

Permission to park on the campus is granted, for a charge, to students and others associated with the University, but this permission is conditional upon co-operation in the observance of the regulations. Penalties will be imposed for infractions and, under certain circumstances, cars will be towed away at the owner's risk and expense. Security personnel are authorized to issue City of Ottawa traffic tickets on campus. Fines for City of Ottawa tickets are set by the city and may vary from time to time. Any vehicle not displaying a valid Carleton Permit is subject to this type of ticket.

In this, as in other respects, examination grades will be withheld from students owing sums of money to the University. Unless cause can be shown, the third infraction may lead to withdrawal of parking privileges. The University accepts no responsibility for cars or their contents parked or operated on the campus. The regulations related thereto are available in the Parking Office. Students and staff who bring cars to the campus are expected to make themselves familiar with these regulations. Parking lots are indicated on the map at the back of the Calendar, pp. 478-479.

Parking Office: 788-3623.

Insurance Regulations and Information

Medical insurance is compulsory for all full-time students. It is the student's responsibility to provide the insurance number when receiving medical care.

All residents of Ontario must be covered by OHIP

OHIP Information

Full-time students are covered under their parents' plan until their twenty-first birthday. When individuals become 21 they must apply for coverage in their own name. This should be done a few months prior to the twenty-first birthday.

Physicians' fees at Health Services, as well as laboratory work, X-rays, and most referrals are paid for by the Ontario Health Insurance Plan (OHIP). It is important, therefore, for every student to read the Ontario Health Insurance Plan General Guide. This booklet is available without cost at Health Services, 6th Level Unicentre 788-6674.

New Residence to Ontario

Students entering Ontario from *outside Canada* will be eligible for OHIP coverage on the first day of the month following the month of application, provided they apply immediately after arrival in Ontario.

Students whose Canadian residence is *outside Ontario* should have coverage under their provincial plan. These claims are processed directly at the Health Services.

You should carry your health insurance number with you at all times.

If you do not have your number, you will be billed for the services rendered. The University may withhold the marks of students with outstanding accounts.

Immunization Record

It is strongly recommended that new students:

1. have a tuberculin skin test unless they are tuberculin-positive, in which case a chest X-ray is required; and
2. obtain from their family physician documentation of their immunization status to red measles, German measles, mumps, polio and tetanus.

Disabled Students

It is a disabled student's responsibility to provide relevant medical documentation to Health Services if medical services are required.

Fees

The student health fee is used to pay for special medical supplies and educational program expenses. In addition, the fees cover a portion of costs for salaries and supplies related to the administration of Health Services. The service is an ancillary, self-financed department.

The University Library is located on the south-west side of the main quadrangle. The collection consists of over one million books and periodicals and more than 700,000 microfilms, microfiches, cassettes and discs. The majority of these items are on open shelves. The Map Library, with 129,000 maps and atlases, is housed in the Loeb Building, Room D299.

The library's main (or second) floor contains the Reference and Information, Documents, Circulation, Interlibrary Loans, and Photocopy services. The first floor houses books and periodicals in science and technology; the third contains books and periodicals in the humanities, and the Audio-Video services; the fourth and fifth floors contain the remainder of the collection, with Micro on the fourth floor. Seating is available on all floors.

The library is governed by regulations approved by Senate, copies of which are available at the Information Desk.

The library collection is protected against theft by an electronic book detection system. As a condition of use of the library, all users must submit books, brief cases, bags, etc. for inspection at the exit, if requested to do so. Late return fees are charged for overdue books and, as noted under "Delinquent Accounts," examination grades and transcripts will be withheld from students owing money to the University.

Geoffrey H. Briggs, M.A. (Cambridge) Dip.Lib., Dip. Arch. (London), University Librarian

Neil Brearley, B.Sc. (London) B.L.S. (British Columbia), Administration

E. Martin Foss, B.A. (Alberta) B.L.S. (British Columbia), Technical Services

Linda Rossman, B. Math. (Waterloo) M.L.S. (Toronto), Information Services

Terry Clark, B.A. (Winnipeg) M.A. (Manitoba) M.L.S. (Western Ontario), Systems Development

Milly Armour, B.Sc. (Glasgow) B.L.S. (Ottawa), Reader Services

Gail Catley, B.Sc., M.L.S. (McGill), Acquisitions

Bozena Clarke, B.A. (Carleton) M.L.S. (Toronto), Serials

Barbara Farrell, B.A. (London) M.A. (Carleton), Maps

Marcia Jacklin, B.Sc. (Guelph) M.L.I.S. (McGill), Media Services

Susan Jackson, B.A. (Carleton), B.L.S. (McGill), Documents

Callista Kelly, B.A. (Carleton), B.L.S. (Ottawa), Interlibrary Loans

Jeremy Palin, B.A., B.L.S. (British Columbia), Special Collections and Archives

Naomi Roberts, B.A. (Oxford) M.S.L.S. (Catholic University of America), Gifts

Dorothy Rogers, B.A. (Wellesley) M.A. (Yale) B.L.S. (Toronto), Cataloguing

School of Continuing Education

School of Continuing Education

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Administration Building, Room 302
Telephone: 788-3500

Officers of the School

Director
Tom Wilkinson

Special Student Services
Bernadette Landry (*Assistant Director and Registrar*)
Karen Spencer (*Assistant Registrar*)

itv, Distance and Community Education
Robin Allardyce (*Assistant Director*)
Beverlae Buckland (*Program Co-ordinator*)

Professional and Personal Development Programs (non-credit)
Regina Aulinskas (*Associate Director of the School*)
Bonnie Schmidt (*Program Co-ordinator*)
Keith Cattell (*Business and Government Liason*)

General Information

The School of Continuing Education, in conjunction with other departments at Carleton, co-ordinates and develops both existing and new activities in adult, part-time and non-traditional education.

All currently registered and prospective Special students and Continuing Education students (see Student Classifications, below), should contact the School for *registrarial information* and to make *academic orientation* appointments (788-3500). Evening appointments are available.

Office Hours

Labour Day to April 30
Monday to Friday, 9 a.m.-5 p.m.
Monday to Thursday, 6:30-8:30 p.m.

May 1 to Labour Day
Monday to Friday, 8:30 a.m.-4:30 p.m.
Monday to Thursday, 6:30 p.m.-8:30 p.m.

Part-time and Non-traditional Studies

Information of particular interest to part-time students is contained in various sections of this Calendar. The Carleton Glossary (p. 7), the Academic Year (pp. 8-9), General Information (p. 10), the Course Designation System (p. 11), the University Office Guide (p. 14), Student Services (p. 16) and General Regulations (p. 23) are all sections of primary interest.

Current or prospective part-time degree students are encouraged to consult the appropriate Faculty regulations.

Faculties of Arts and Social Sciences, pp. 52-264
Faculty of Science, pp. 343-413.
School of Computer Science, pp. 265-278.
Faculty of Engineering, pp. 280-318.
School of Architecture, pp. 319-332.
School of Industrial Design, pp. 333-342.

Further information may be obtained from appropriate Faculty Registrar's offices. (See University Office Guide p. 14 for the telephone numbers and locations.)

Carleton University offers *distance education* courses

through television (itv, over the local cable channel 15 or on videocassette or local cable networks in surrounding communities) and at a number of enriched environments in the greater Ottawa area. For further information concerning these courses contact itv at 788-3500.

Through Carleton University's *Continuing Education (non-credit)* programs, a variety of short courses is available in business, professional and personal development and languages. *These Continuing Education courses (prefix CE) do not carry credit toward the completion of a degree.* The courses are described in a separate brochure, which can be obtained from Room 302 Administration Building (788-3501).

Student Classification

As outlined on p.11, there are several distinct student classifications at Carleton. Students are classified on the basis of whether they have been formally admitted to a degree program, not on the basis of whether they are studying part-time or full-time.

Degree students are those who have been admitted to, and are enrolled in, a degree program, whether graduate or undergraduate, on either a full-time or part-time basis.

Special students are those who have not been admitted to a degree program but who are taking degree-credit courses to qualify for admission, to improve professional or vocational qualifications, for transfer credit or for personal interest.

Continuing Education students are those enrolled for non-credit Professional and Personal Development courses offered through the School of Continuing Education. Detailed information regarding all non-credit programming can be obtained by telephoning 788-3501.

Special Students

Any interested person is eligible to enrol as a part-time Special student in degree-credit courses, subject to availability and presentation of any prerequisite(s) for the course(s).

Special students enrol in the same courses as students in degree programs. Day and evening courses are available.

All registrarial services for Special students are provided through the School of Continuing Education, Room 302, Administration Building, 788-3500.

Proficiency in English

See p. 24.

Course Load

Special students may normally enrol in a maximum of two full credits per academic session (Fall/Winter or Summer) and no more than the equivalent of two half credits in any one term.

Special students who have completed one or more full credits with an overall 5.0 (C) grade-point average in all credits taken at Carleton (including failures) may register in the equivalent of three half credits in each term of the Fall/Winter session.

Special students studying in the Summer session may register for a maximum of two full credits (or equivalent).

This total includes audited courses and those taken during intersession.

During the Fall/Winter session, Special students may enrol in five full credits under either of the following conditions:

1. The student is enrolled full time in a degree program at another institution and can present a Letter of Permission authorized by an appropriate official of the institution; or
2. The student holds an undergraduate degree from a recognized institution and wishes to pursue further study for professional development or in preparation for entry into graduate study.

Course Selection

Anyone wishing eventually to be admitted to a degree program is advised to note the specific Faculty requirements for First-year students as they are listed in this Calendar. Special students who have not completed an Ontario Secondary School Honours Graduation Diploma or the equivalent may have to upgrade their qualifications by enrolling in courses at the Qualifying-University-year level.

Special students are encouraged to consult directly with departments when selecting specific courses of study or with the School of Continuing Education.

Special Students Enrolling in Graduate-Level Courses

Anyone wishing to enrol in a graduate level course as a Special student must receive a letter of permission from the Chair or Supervisor of Graduate Studies of the appropriate department. Anyone considering a graduate degree is urged to contact the Faculty of Graduate Studies and Research prior to registration as a Special student. Special students enrolled in a Graduate level course(s) are subject to Special-student regulations outlined in the Undergraduate Calendar. (See also p. 13.)

Returning Special Students

In order to be eligible for further registration, returning Special students must pass four of their previous six full credits (or equivalent) with a C- standing or higher in at least two full credits (or equivalent). A grade of Abs (Absent) is judged equivalent to a grade of FNS (Failure, No Supplemental privileges) in determining eligibility for further registration as a Special student.

Students who are required by the University to withdraw from a degree, certificate or diploma program are ineligible to register as Special students for one calendar year. In addition, such students should not normally expect to gain readmission to a degree program on the basis of work completed as a Special student, nor should they expect to retain credit for these courses.

Course Change and Course Withdrawal

Special students wishing to make any change in their registration must inform the School of Continuing Education, by telephone or in person.

Course changes must be made by the deadline dates designated in the Academic Year (see pp. 8-9). *Changes include additions, withdrawals, section changes, as well as changes of status from credit to audit or vice versa.*

Please note that students who are withdrawing from a course or courses, or from the University entirely, must notify the Continuing Education office, either by telephone, by letter, or in person.

The date of withdrawal is the date on which the written

notification is received in the Continuing Education office. Fee adjustments will also be calculated as of that date.

The withdrawal, with the date of withdrawal, will be entered on the student's transcript as *Wdn*, which is defined as "Withdrawn in good standing. No academic credit." No academic penalty is attached to this grade.

It is not possible to withdraw from a course(s) or from the University after the last date for withdrawal. See pp. 8-9.

For complete details about fee adjustments see p. 44 (Fees).

Notes:

1. *The responsibility for taking all steps necessary for withdrawal rests entirely with the student.* Non-attendance of classes, or informing an instructor of intent to withdraw does not constitute withdrawal.

2. A student who withdraws from a course retains no academic credit for any part of that course.

Supplemental and Special Examination Privileges

Supplemental and/or grade-raising examinations written by Special students will be graded according to the regulations of the Faculty in which the course is given. Supplemental and/or grade-raising examinations are made available at the discretion of the Department or School involved. A Special student registered in one, two or three credits, who fails only one credit, may write supplemental and/or grade-raising examinations to a maximum of one full credit. Supplemental and/or grade-raising examination privileges will not be granted to students who fail more than one full credit.

A Special student registered in four full credits may write supplemental and grade-raising examinations to a maximum of one full credit each, or two full credits of grade-raising examinations.

A Special student registered in five or more full credits may write supplemental and/or grade-raising examinations to a maximum of two full credits.

Supplemental and/or grade-raising examination privileges will not be granted to a full-time Special student who does not pass at least three credits during the Fall/Winter session.

A Special student who wishes eventually to enrol in a degree program of a Faculty at Carleton University is strongly encouraged to pay particular attention to the supplemental and/or grade-raising examination regulations for that faculty.

Special students are eligible to write deferred final examinations under the conditions indicated on p. 39.

Special students must make application for supplemental and special examinations at the Continuing Education office by the published deadlines. (See pp. 8-9.)

Appeals

A Special student has the right to appeal any decision regarding the application or interpretation of academic regulations made by the School of Continuing Education.

Appeals must be made in writing and should be submitted to the Secretary, Special Student Policy and Appeals Committee, c/o School of Continuing Education, Room 302, Administration Building, Carleton University.

Financial Assistance

Special students interested in obtaining financial assis-

tance are advised to contact the Student Awards Office at 788-3600. For further information, see pp. 16-17 (Awards Office).

Admission to Degree Programs

Carleton University has always recognized that many adults may lack the formal requirements for admission as outlined on pp. 24-30 of this Calendar. Because of work experience and mature outlook, it is expected that many of these adults will succeed in a degree program. Two avenues of admission to degree programs exist for these potential students: through regulations governing mature applicants or following successful completion of a specified number of credits under regulations governing Special students. Special students considering degree studies are encouraged to consult with the School of Continuing Education at 788-3500 or the Office of Admissions and Academic Records at 788-3663.

Credits completed by a Special student may be applied towards a degree program only after a formal application of admission has been made and the student is officially admitted to an undergraduate degree program.

Admission to a Degree Program as a Special Student

Special students may be admitted to degree study upon indicating, through academic achievement at Carleton, a reasonable probability of future academic success. However, previous post-secondary studies will be taken into consideration at the time an application for admission is evaluated.

Students are encouraged to contact the Office of Admissions and Academic Records or the School of Continuing Education before attempting to qualify for admission on the basis of studies as a Special student.

Special students who meet the age requirements for a mature applicant will normally be considered on this basis only if they have obtained a grade of C- or better in at least one full credit (or equivalent) in one attempt (or equivalent) and are eligible to continue as Special students.

Admission to a Degree Program as a Mature Applicant

Anyone who cannot present the normal admission requirements as published in this Calendar may receive consideration for admission under the mature-applicant policy. Applicants will normally have been away from full-time studies for a minimum of two years, must be 21 years of age or over by December 31 of the year in which they wish to enrol, and must be either a Canadian citizen or permanent resident.

Anyone who meets the age requirement is eligible to be considered for admission as a mature applicant to either part-time or full-time studies. This category, however, is designed for individuals who do not meet normal admission requirements but who would probably be successful in university studies.

Anyone who satisfies the foregoing requirements will normally be admitted to a degree if he or she has:

- (a) secondary school graduation in an academic program with a 60 percent average; or
- (b) completed at Carleton, one appropriate full-course credit with a C- or higher standing, in one attempt; or
- (c) other academic or work experience that, in the opinion of the admissions committee, indicates a likelihood of success at university

Only Canadian citizens and permanent residents are considered for admission as mature applicants. Those who have previously been involved in a university or college-level program as full-time students are not normally eligible as mature applicants, regardless of age. They are assessed for admission on the basis of their most recent academic experience.

Mature applicants are normally considered for admission to the First year of an undergraduate program in Arts, Science or Engineering. However, applicants seeking admission to the Faculty of Science who lack the prerequisites as they are listed on p. 35, may be required to take Qualifying-University-year courses in addition to the regular program. Students in a similar situation in relation to the Faculty of Engineering will not normally be considered until the prerequisites as listed on p. 33 have been completed.

Mature applicants are not usually considered for admission into an Honours program (e.g. Business, Computer Science, Journalism) or into Architecture or Industrial Design. However, if the admission requirements for the Honours program are met at the end of the First year of undergraduate study, an application to transfer to the chosen program may be made.

Applicants are required to submit proof of age and biographical information with their application for admission. Special students at Carleton University who meet the age requirements will be considered for admission as mature applicants if

- (a) They have obtained a grade of C- or better in at least one full credit (or equivalent) in one attempt; and
- (b) They are eligible to continue as Special students;

Transfer Credits to Another University

Students who wish to attend Carleton to receive credits toward a degree program taken elsewhere are eligible to register at Carleton as Special students. Such students who wish to exceed the normal course load or attend full-time should write or consult directly with the Registrar of the School of Continuing Education well in advance of the session for which they plan to register.

Faculty of Arts

Faculty of Social Sciences

Officers of the Faculty

Dean

J.M. Yalden

Associate Dean

J.J. Healy

Secretary of the Faculty

R.C. Blockley

Registrar

C.E. Dence

Directory of Offices

Office of the Dean,
2009 Dunton Tower, 788-2355

Office of the Associate Dean,
2011 Dunton Tower, 788-2354

Registrar's Office,
312 Paterson Hall
Recorded general information, 788-6690
Other enquiries, 788-6691

Applied Language Studies, I.W.V. Pringle, Director,
215 Paterson Hall, 788-6613

Art History, R.J. Mesley, Chair,
2201 Dunton Tower, 788-2342

Canadian Studies, J.M. Vickers, Director,
1116 Dunton Tower, 788-2366

Classics, T.R. Robinson, Chair,
2015 Dunton Tower, 788-2301

Comparative Literature*, Chair to be announced,
1726 Dunton Tower, 788-2177

Directed Interdisciplinary Studies, A. Riding, Co-ordinator,
2115 Dunton Tower, 788-2368

English Language and Literature, R.G. Laird, Chair,
1812 Dunton Tower, 788-2310

English as a Second Language,
see Applied Language Studies, 788-6613

Film Studies, G. McKnight, Chair
427 St. Patrick's Building, 788-5606

French, J. Kealey, Chair,
1602 Dunton Tower, 788-2168

German, A. Bohm, Chair,
1315 Dunton Tower, 788-2116

History, R.C. Elwood, Chair,
403 Paterson Hall, 788-2828

Italian, F. Loriggio, Chair,
1426 Dunton Tower, 788-2108

Journalism, A. Westell, Director,
346 St. Patrick's Building, 788-7404

Labour Studies, F. Griezic, Co-ordinator,
414 Paterson Hall, 788-2825

Linguistics, A. Freedman, Chair,
249 Paterson Hall, 788-2804

Mass Communication, E. Saunders, Associate Director
310 St. Patrick's Building, 788-7408

Medieval Studies, D. Le Berrurier, Chair,
2209 Dunton Tower, 788-2351

Music, B. Gillingham, Chair,
A927 Loeb Building, 788-3734

Philosophy, A. Jeffrey, Chair,
2125 Dunton Tower, 788-3822

Religion, L.T. Librande, Chair,
2121 Dunton Tower, 788-2100

Russian, A. Lewinson, Chair,
3A36 Paterson Hall, 788-6646

Spanish, C.A. Marsden, Chair,
1402 Dunton Tower, 788-2109

Visual and Performing Arts, Co-ordinator,
427 St. Patrick's Building, 788-3735

*Graduate level programs only. For details please see
Graduate Studies and Research Calendar. For under-
graduate courses in Comparative Literature see pp. 99-
101.

Officers of the Faculty

Dean

M. Marshall

Associate Dean

To be announced

Secretary of the Faculty

D.K. Bernhardt

Registrar

C.E. Dence

Political Science, J.H. Pammett, Chair,
B640 Loeb Building, 788-2777

Psychology, W. Jones, Chair,
B551 Loeb Building, 788-2644

Public Administration, Eugene Swimmer, Director,
1001 Dunton Tower, 788-2547

Social Work**, G. Walker, Director,
469 St. Patrick's Building, 788-5601

Sociology and Anthropology, S. Richer, Chair
D795, Loeb Building, 788-2583

Soviet and East European Studies, C. Jacobsen, Director,
459 Paterson Hall, 788-2887

Technology, Society, Environment Studies, P. Kruus,
Chair,
460 Steacie Building, 788-4483

Urban Studies, C. Gordon, Co-ordinator,
B750 Loeb Building, 788-2582

Women's Studies, F. Cherry, Director
330 Paterson Hall, 788-6645

*Graduate-level program. For details please see Graduate
Studies and Research Calendar.

**One undergraduate course; Graduate-level program
only. For details of graduate program please see Graduate
Studies and Research Calendar.

Directory of Offices

Office of the Dean,
B450 Loeb Building, 788-3741

Registrar's Office,
312 Paterson Hall
Recorded general information, 788-6690
Other enquiries, 788-6691

African Studies, L. Mytelka, (fall) M. Bienefeld (winter),
Chair
B649 Loeb Building, 788-6671

Anthropology, See Sociology-Anthropology

Asian Studies, O. Mehmet, Chair,
2A49 Paterson Hall, 788-3532

Biology, D.R. Gardner, Chair,
587 Tory Building, 788-3888

Business, Louise Heslop, Acting Director,
904 Dunton Tower, 788-2378

Canadian Studies, J.M. Vickers, Director,
1116 Dunton Tower, 788-2366

Criminology and Criminal Justice, R.P. Saunders, Co-or-
dinator,
3A40 Paterson Hall, 788-2588

Directed Interdisciplinary Studies, A. Riding, Co-ordinator,
2115 Dunton Tower, 788-2368

Economics, E. Choudhri, Chair,
C871 Loeb Building, 788-3744

Geography, M. Fox, Chair,
B350A Loeb Building, 788-2560

International Affairs*, C.J. Maule, Director,
2A59 Paterson Hall, 788-6655

Labour Studies, F. Griezic, Co-ordinator,
414 Paterson Hall, 788-2825

Law, R.P. Saunders, Chair,
C473 Loeb Building, 788-3691

Mathematics and Statistics, C.W.L. Garner, Chair,
712 Dunton Tower, 788-2155

Political Economy*, M.B. Dolan, Director,
304 Social Sciences Research Building, 788-2794

Faculty of Arts; Faculty of Social Sciences Degree, Certificate and Diploma Programs

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Office of the Registrar, Faculties of Arts and Social Sciences

Registrar
C.E. Dence

Associate Registrar
D. McKenna

Assistant Registrar
J. Nordenstrom

Academic Advisers
J. Clarke
R. Jones

The Office of the Registrar is a source of general information on the faculties' academic programs. Specific information about course content, subject matter, and the structure of Pass or Honours programs is obtainable from the academic departments.

Degree, Certificate and Diploma Programs

The Faculties of Arts and Social Sciences offer programs in six degrees, five certificates and one diploma.

Bachelor of Arts and Bachelor of Arts with Honours (B.A.)

The three-year Pass B.A. program provides a liberal university education of value either as a general intellectual preparation for a great number of non-specialized careers, or as an introduction to subsequent specialized study.

The four-year program of the Honours B.A. provides more rigorous and extensive study in one or two disciplines. The Honours degree is necessary for entry to certain fields of employment, and is a desirable preparation for graduate studies and professional training, including teaching.

Bachelor of Commerce (B.Com.)

The four-year Honours program in Commerce provides a foundation in the disciplines essential to careers in business. The program is offered by the School of Business.

Bachelor of Journalism (B.J.)

The four-year Honours program is designed to prepare students for careers in the mass media. The program is offered by the School of Journalism.

Bachelor of Music (B.Mus.)

The four-year Honours program prepares students for graduate studies in musicology and ethnomusicology, and gives an essential background for careers in music librarianship, music administration, and teaching. The program is offered by the Department of Music.

Bachelor of Public Administration (B.P.A.)

The four-year Honours program provides a foundation in the disciplines relevant to the practice of public administration. The program is offered by the School of Public Administration.

Certificate in English Language and Composition (C.E.L.C.)

This is a five-credit post-degree certificate intended primarily

for practising teachers, to upgrade their knowledge of areas of language and of writing theory that underlie the new Ontario guidelines. It is also open to persons without a degree who hold a teaching certificate. The program is offered by the Department of English Language and Literature.

Certificate in French Language Studies (C.F.L.S.)

This is a six-credit program designed to permit people who already have some knowledge of French to achieve a high level of proficiency in the language. The program should be of particular interest to mid- and senior-level public servants, business people, teachers and other professionals as well as members of the general public. The program is offered by the Department of French.

Certificate in French Translation Studies (C.F.T.S.)

This is a six-credit program designed to permit students to acquire and improve skills in translation from English to French. While it is not a professional program, this certificate should meet the needs of those who are occasionally called upon to translate in their work environment. The program is offered by the Department of French.

Certificate in Public Service Studies (C.P.S.S.)

This is a six-credit program in public service subjects at the undergraduate level. The program is offered by the School of Public Administration.

Certificate in the Teaching of English as a Second Language (C.T.E.S.L.)

This is a five-credit program in the theory and practice of teaching English as a second language. The program is offered by the Department of Linguistics.

Certificate in Law Enforcement Studies (C.L.E.S.)

This is a six-credit program designed for persons employed in the area of law enforcement, national security or corrections. The program is co-ordinated by the Departments of Law and of Sociology and Anthropology.

Diploma in Music (Dip.M.)

This is a one-year undergraduate program in music combining musical performance with courses in general musical literacy, theory and history of music. It is offered by the Department of Music.

Part-Time Study

Part-time study is a viable method of attaining a degree in the Faculties of Arts and Social Sciences. A wide choice of courses is taught in the evening and during the summer. In addition, part-time students are welcomed into day courses.

Part-time students who wish to limit their studies to evening and summer times should note that the following departments teach a range of courses in the evening and during the summer that will permit students to complete a major in their discipline.

Arts
Art History
Canadian Studies
English Language and Literature
French

German
History
Linguistics
Music
Philosophy
Religion
Spanish

Social Sciences

Economics
Geography
Law
Political Science
Psychology
Sociology/Anthropology

Students have the choice between full- and part-time registration and may freely alternate between the two.

Students wishing to pursue an Honours degree on a part-time basis are urged to consult with the appropriate department(s) about the scheduling of courses.

Academic Clubs and Societies

The following clubs and societies serve to broaden and enrich the curriculum, and to offer students social activity and friendship related to their intellectual interests. The societies listed here are particularly pertinent for students registered in the faculties of Arts or Social Sciences.

The Carleton University Biology Society sponsors a variety of academic events including meetings between faculty and students, seminars and field trips. The society also uses social functions to promote informal contact between faculty and students, and is active in acquainting students with on-going biological research. Faculty adviser: to be announced.

The Carleton Classics Society sponsors public lectures by visiting speakers and student-faculty social gatherings. Faculty co-ordinator: Chair of the Classics department.

The Carleton Commerce Society organizes social and academic events to strengthen the link between students, faculty, and the business community, and to promote stronger ties among Business students.

The Carleton Economics Society (CUES) sponsors academic events that are of interest to students in Economics, as well as a variety of social functions to strengthen ties among the students and to promote informal contact with the faculty of the Department. Faculty adviser: R.F. Neill.

ELSS, the English Literature Students' Society, open to all students, offers theatre trips, work with a printing press, a lecture series, writers' groups, debating groups, reading groups, parties and the publication of a creative writing monthly. Faculty liaison: R.G. Laird.

The Carleton Film and Video Society, open to all members of the University, involves public film and video screenings, related to this field of study, as well as guest lecturers. Faculty adviser/sponsor: G. McKnight.

The Club Francophone is open to all members of the University interested in the French language and in French and French-Canadian culture. The Club promotes informal language practice and sponsors speakers, discussions, musical and social events, films and excursions. Faculty advisers: W. Fraser, N. Sarma, M. Laurier

The Carleton University Geography Society (CUGS) or-

ganizes lunch-time talks or movies of academic interest and a variety of social events, promotes student-faculty contact, and sponsors the Harvey Humbolt Chair of Geomorphography.

The German Academic Society (formerly Deutschklub) is open to all members of the University interested in the language and culture of German-speaking countries. Regular meetings, with films and speakers, are featured. Faculty contact: Chair of the Department of German.

The Ottawa Historical Association is a "town and gown" association of people interested in history, offering a series of lectures and discussions.

The Carleton Italian Society, in collaboration with the Department of Italian, sponsors lectures on Italian topics, and round tables, poetry readings, Italian films, social events and informal discussions for students interested in Italian culture.

The Carleton Linguistics Society sponsors academic events that are of interest to students in Linguistics and the Certificate Program in the Teaching of English as a Second language, as well as a variety of social functions to strengthen ties among the students and to promote informal contact with the faculty of the Department. The Society also provides a tutoring service for students in introductory courses.

CMASS, The Carleton Mathematics and Statistics Society, promotes contact among students of mathematics and statistics and faculty by sponsoring events, seminars and films. Faculty adviser: to be announced.

The Mass Communication Society of Carleton University participates in academic conferences, sponsors talks, holds an annual career fair and stages social events.

The Department of Music sponsors a number of groups which are open to anyone who is interested and which perform both on and off campus throughout the year. *The Carleton Choir* is open to anyone who loves to sing. *The Carleton Concert Band* is open to anyone with skill on an instrument. *The Carleton Jazz Ensemble* is open to those who love to play jazz, by audition only. *The Collegium Musicum* performs music from the medieval period to the 17th century. *The Twentieth Century Performance Group* specializes in music by avant-garde composers and students in the Department. It is a group of 15 to 20, and auditions may be required. In addition, *The Music Society* is a group of students which sponsors various activities.

The Carleton University Philosophy Society organizes lectures, discussion groups and social events for all members of the Carleton University community interested in philosophy. Further information is available through the secretary of the Department of Philosophy.

The Political Science Forum, the academic society of the Department of Political Science, promotes communication among students and faculty through seminars, speakers, symposia and social events.

The Carleton Press Club, the academic society of the School of Journalism, sponsors talks, panel discussions and social functions. The Press Club also publishes a yearbook for the School of Journalism called "The Next Estate."

The Public Administration Undergraduate Society organizes social and academic events to strengthen ties between students and faculty and to help acquaint students with current issues in public administration.

La Sociedad Hispanica (Hispanic Society) welcomes all members of the University interested in Latin American and

Spanish cultures and language. The emphasis is on the practice of the spoken language in a relaxed atmosphere and on sponsoring films, lectures and social events to expose others to these cultures.

The Academic Regulations

New Regulations Governing Academic Standing and Graduation

New regulations governing academic standing and graduation were introduced September 1, 1989 for all students in the Faculties of Arts and Social Sciences.

The new regulations are contained in the sections marked (*) in the index of regulations, below.

Continuing students as well as students newly admitted to the Faculties are governed by these regulations. However, students continuing in degree programs in Arts and Social Sciences to which they were admitted prior to the 1989-90 Session and who subsequently are: (a) placed on probation, (b) debarred, (c) ineligible to continue in Honours, or (d) ineligible to graduate, will be re-evaluated under the old regulations for standing and graduation.

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 - 1.3 Requests and Petitions
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 - 2.2 Readmission
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 - 6.2 Supplemental Examinations
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 - 7.1 Application to Graduate
 - 7.2 Graduation Grade Point Averages
 - 7.3 Graduation Requirements, Pass B.A.
 - 7.4 Graduation with Distinction
 - 7.5 Graduation Requirements, Honours B.A., B. Com., B.J., B. Mus., and B.P.A.
 - 7.6 Classes of Honours
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 - 8.3 Course Selection

1. Administration of the Regulations

1.1 General Administration

The regulations on the following pages apply, except when noted, to all degree, diploma and certificate programs of the faculties administered by the Faculty Registrar's Office and the student's school or Major department. The Faculty Registrar's Office provides an Academic Advisory Service, and students are urged to seek advice on all questions about the regulations, and in particular before taking any action affecting promotion and probation, withdrawal, transfer of credit, review of grades, and change of Major or degree program. Appointments: 320 Paterson Hall (788-6699).

1.2 Student Responsibility

Students are responsible for knowing and complying with the regulations and for registering in the courses required to fulfil degree requirements. Specific written permission must be obtained for exceptions to the regulations. Permission granted by a department must be confirmed by the Faculty Registrar's Office.

1.3 Requests and Petitions

The Joint Committee on Admissions and Studies is responsible for considering student requests for special consideration respecting the regulations. Decisions on requests are made by the Registrar according to guidelines set by the Committee. Students may have such decisions reviewed by petitioning the Committee.

Requests and petitions are made in writing to the Faculty Registrar's Office, if possible on the forms provided. Students should discuss their requests or petitions with an

adviser. The circumstances of any request or petition are held in the strictest confidence.

2. Admission, Readmission, and Degree Transfer

2.1 New Students

Detailed requirements for initial admission to the Faculties' degree and certificate programs are given on pp. 24-30.

2.2 Readmission

Students in the following categories are required to apply for readmission before registration. Readmitted students are governed by the regulations in effect at the first registration following readmission.

- (a) Students who after graduation wish to pursue a further degree;
- (b) Students who have been absent from the University for two consecutive Fall/Winter sessions and the intervening Summer session;
- (c) Students who have been admitted and have taken courses at any other post-secondary institution since their last registration at Carleton (except students studying on a Letter of Permission from the Faculty Registrar's Office);
- (d) Students who have been debarred.

Note:

Applications for readmission (obtainable from the Admissions Office) must be filed before June 30 for the Fall/Winter session and before April 1 for the Summer session.

2.3 Change of Degree Program

Applications to change degree programs must be made to the Faculty Registrar's Office by June 30 for the Fall/Winter session, by December 1 for Winter term of the Winter session, and by April 1 for the Summer session.

Students who are transferring are governed by the regulations in effect at the first registration following the transfer.

Note:

Transfer applications received during the month of July may not be processed in time for the student to take advantage of early registration.

3. Registration

3.1 Registration

Students must complete their registration, including fee payment, during the official registration periods shown for the session or term in the schedule for the Academic Year on pp. 8-9.

3.2 Late Registration

Registration during the late registration period incurs a late registration charge. Registration is not permitted after the late registration period.

Students should note that mere attendance in a course does not constitute registration in that course.

3.3 Credit Value

Unless otherwise indicated, courses in the Faculties are of one full credit, indicated 1.0 on all records documents. Courses marked ★ are half-credit courses, indicated 0.5.

3.4 Definition of "Year"

Undergraduate students in the Faculties of Arts and Social Sciences (other than those admitted to Qualifying-University year) are given "Year" standing according to the number of credits completed with passing grades and counting towards the degree or certificate. The categories are as follows:

First Year:

Fewer than 4.0 successfully completed credits;

Second Year:

4.0 through 8.5 successfully completed credits;

Third Year:

9.0 credits through 13.5 successfully completed credits;

Fourth Year:

14.0 or more successfully completed credits.

Students admitted to Qualifying-University year will be permitted to register with First-year standing upon successful completion of at least 4.5 credits towards the Qualifying-University year requirements, with the understanding that all outstanding Qualifying-University year requirements must still be met prior to graduation, in addition to the usual degree requirements.

3.5 Course Load

In the Fall/Winter session, in all programs but Journalism, students may register in up to five half-credits per term or equivalent, audited courses included. The normal course load in Third-year Journalism is 5.5 credits.

In the Summer session, students may register in a maximum of two half-credits or equivalent per term, including audited courses as well as supplemental and grade-raising examinations.

3.6 Course Overload

Permission of the Registrar is required to register in a course overload. Such permission will be available only to students whose CI is 7.00 or higher (see 5.4 for the definition of the CI). The maximum load permitted is six half-credits per term in the Fall/Winter Session and three half-credits per term in the Summer session.

3.7 Auditing

Students may, with the instructor's permission, register in some courses as auditors. (See p. 36 for details.) Auditors receive no grade and no credit for the course. No change from credit to audit or from audit to credit will be permitted beyond the last day for course changes in any course. Auditors are not permitted in some courses; in particular, students are not permitted to audit courses with limited enrolment.

3.8 Change of Course and Section

Changes of course, or of section within a course, must be done through the telephone registration system by the following dates:

Fall/Winter full session: September 21

Fall term: September 21

Winter term: January 18

3.9 Withdrawal

Students withdrawing from courses or from their entire program must phone the telephone registration system on or before the following dates. Students receiving scholar-

ships or financial assistance should consult the Awards Office before dropping courses.

Fall/Winter full session: March 15

Fall term: November 9

Winter term: March 15

For Summer session 1990 see the Summer Session Supplement.

For Summer session 1991 see the Academic Year pp. 8-9. Consult p. 44 for the financial implications of withdrawal.

Note:

The onus for officially withdrawing by the telephone registration system rests solely with the student. Ceasing to attend lectures or informing the instructor does not constitute withdrawal, and will result in an Abs or FNS grade.

3.10 Exchange Agreements

Students in Good Standing (see 5.2) may be eligible to study elsewhere on one or more of the many exchange agreements available to undergraduate students.

University of Ottawa Exchange Agreement

Carleton undergraduate students may register to take courses at the University of Ottawa to be credited to their Carleton degree. The following regulations apply:

1. Students must be registered in a degree program at Carleton, have completed successfully a minimum of four credits toward that degree and be in Good Standing as defined in 5.2.
2. Only courses to be credited as part of degree requirements at Carleton may be taken under the terms of the exchange.
3. At any time, the cumulative total of courses taken by the student at Carleton and counting toward the degree must be greater than the total number of courses taken and proposed at the University of Ottawa and counting toward the degree.
4. Courses taken under the Exchange Agreement will not satisfy the residence requirement (3.13).
5. Grades for courses taken on the Exchange Agreement will be reported on the Carleton transcript and will be included in the CI and in the grade-point averages calculated for various purposes.

Applications to participate in the Exchange Agreement are available in the Faculty Registrar's Office. Please consult the Registrar's Office about deadlines and procedures. Students should note that space in courses may be limited and therefore applications should be filed as early as possible.

Students withdrawing from an exchange agreement course must notify both Universities, or a grade of Abs or FNS may be recorded. There may be financial implications.

Université de Savoie, Chambéry, France

This program is open to non-francophone students in an Honours or Combined Honours program in French in their Third year of studies. Application should be made to the Department of French during Second year. Grades are not transferred to the student's Carleton record for courses taken under this agreement. Students register at Carleton prior to departure for France and must notify both Universities if withdrawing from the agreement. For general information and information about fees contact the French department. Financial assistance is also available.

Université du Québec, Trois Rivières

This program is open to non-francophone students in an Honours or Combined Honours program in French in their Third year of study. Application should be made to the French department during Second year. Grades are not transferred to the student's Carleton record for courses taken under this agreement. Students register at Carleton prior to departure for Trois Rivières and must notify both Universities if withdrawing from the agreement. For general information and information about fees contact the Department of French. Financial assistance is also available.

State University of New York and University of Massachusetts

Exchanges are possible for a year of study at two American universities, the State University of New York (SUNY) and the University of Massachusetts (U. Mass.). Undergraduates should be in their Second year at Carleton when they apply for the exchange. Exchanges are intended to be for an academic year, that is, the two semesters extending from September to December and from January to May but it may be possible to study in the United States for one term only.

Application is made on a form that can be obtained from Carleton International, Room 1506 Dunton Tower (788-2519). Applications must be submitted to Carleton International by February 1 for the following academic year. The application must be accompanied by a short statement describing the student's objectives in studying at another university, an academic transcript, letters from two academic referees, and also by a Letter of Permission from the Registrar's Office (see 3.12). Letters of Permission normally take a month to prepare.

Study Abroad

Carleton maintains a relationship with the Denmark International Studies program in Copenhagen where Carleton undergraduates can spend a year studying liberal arts, international business or architecture. Applications for this exchange must be submitted by October 1 if the exchange student is going for the following Spring term only and by February 1 for the following academic year.

For Honours students in their Fourth year there is an exchange agreement with the University of Edinburgh. Applications must be made by November 30 for the academic year beginning the following October. Consult Carleton International for more information.

3.11 Courses from Other Faculties and Schools

Students must consult the Faculty Registrar's Office about registering in courses from other faculties and schools. Science and interdisciplinary courses are generally acceptable. Courses in Engineering and Industrial Design are generally not acceptable and registration in these courses is not permitted. Performance courses in Music are open only to students in certain Music programs. Professional courses in Journalism are not acceptable options in the B.A. A limited number of Architecture courses are permitted in certain programs only.

3.12 Transfer of Credit

Before taking courses at another university, students must obtain a Letter of Permission from their Registrar's Office.

Students who take courses without obtaining a Letter of Permission will not be granted credit for the courses. Permission obtained from an instructor or from a department does not obligate the University to accept a credit.

Eligibility:

To be granted permission, students must have completed at Carleton a minimum of four credits and must be in Good Standing.

Maximum Load

Subject to the regulations of the host university, a Carleton student studying on a Letter of Permission may take a maximum of 2.0 credits in the Summer and 5.0 credits in the Fall/Winter session.

Transfer Credit Grading

- (a) Grades for courses taken on Letters of Permission will not be transferred.
- (b) The Major department or the Registrar may require that the student obtain a minimum grade higher than the passing grade. The student shall be notified of such a requirement when the Letter of Permission is issued. Should the student pass the course but fail to meet this minimum grade, credit will not be recorded.
- (c) Failure on a course taken elsewhere will be recorded with the appropriate credit value, and will be taken into account in all assessments of eligibility to register and graduate and will be included in the calculation of the CI.
- (d) If a student writes a supplemental examination in a course taken on a Letter of Permission, both the initial failure and subsequent pass or failure will be recorded; each will count as an attempt and will be included in the calculation of the CI (see 5.5).

Reporting

- (a) If students find it necessary to have their Letter of Permission amended they must notify the Registrar's Office prior to completion of the course.
- (b) Students are required to present to Carleton an official transcript showing results in courses taken on a Letter of Permission. If the transcript is not forthcoming, the course will be awarded a failing grade.
- (c) Students completing a final credit for a degree on a Letter of Permission during the Fall/Winter session are warned that transfer grades may not be available in time for Spring graduation.

Application and Fees

- (a) Applications for a Letter of Permission must be obtained from the Faculty Registrar's Office. The application form must be returned to that office accompanied by a photocopy of the official description of the course.
- (b) Applications for a Letter of Permission must be made by November 15, for January registration; March 31, for Summer registration; and July 31, for September registration.
- (c) A processing fee is charged for Letters of Permission. Students should note that this is a per-course, not a per-course-credit, fee. (See p. 43.)

3.13 Residence Requirement**Degree Programs:**

To obtain a degree from Carleton University, students must present a minimum of five credits taken at Carleton and counting toward the degree. These five credits must include credits in the Pass or Honours subject(s) as follows:

Pass: 3.0 credits;

Combined Pass: 3.0 credits in one subject and 2.0 credits in the other;

Honours: 4.0 credits including the Honours thesis or comprehensive examination where it is a requirement of the program;

Combined Honours: 3.0 credits in one subject and 2.0 credits in the other including the Honours thesis or com-

prehensive examination where it is a requirement of the program.

Departments may require that certain of these credits be at the senior level.

Certificate and Diploma Programs

To obtain an undergraduate Certificate or Diploma from Carleton University, students must present a minimum of four credits taken at Carleton, including all core courses.

Multiple Undergraduate Degrees

Students admitted to a second undergraduate program must, in addition to meeting the requirement described above, present a minimum of five credits in a degree program (four in a certificate or diploma program) taken at Carleton and not counted for any previous program. These must include three credits in the area of specialization of the new program. Variations from this pattern may, in very exceptional circumstances, be approved by the Joint Committee on Admissions and Studies. Consult the Faculty Registrar's Office.

3.14 Student Records

Incorrect address information will delay the receipt of awards, examination results, and notification of changes in academic status. Addresses must include postal codes. Students must notify the Faculty Registrar's Office immediately of any change in:

- (a) permanent or home address (used for final grades and registration information);
- (b) local address (used for all mail during the academic session);
- (c) telephone number for permanent address and for local address;
- (d) name.

3.15 Challenge for Credit**Degree Programs**

A student with experience and non-university learning equivalent to a specific Carleton course may receive credit for that course through the Challenge for Credit procedure. If the University is satisfied that a student is adequately grounded in a course, credit may be granted by examination, without the normal requirements of attendance and instruction. Not all departments participate in this procedure. There is a charge for each challenge. A student may present no more than five challenged credits in a degree program. Students must enquire at the Faculty Registrar's Office.

Credits obtained by challenge may be not used to satisfy the Residence Requirement (see 3.13).

Certificate or Diploma Programs

A student may challenge up to one credit in an undergraduate Certificate or Diploma. Students must enquire at the Faculty Registrar's Office.

4. Declaring a Major Discipline

Every student in the Faculties of Arts and Social Sciences is required to offer some level of specialization in one or two disciplines. The discipline of specialization is called the Major discipline.

4.1 Major Disciplines Available

The following table illustrates the choice of specialization available in the Faculties of Arts and Social Sciences. Some

disciplines are offered in separate degree programs. Most are available as single or combined programs in the Pass and/or the Honours B.A. degree program.

Code

P: Pass

PC: Pass Combined

H: Honours

HC: Honours Combined

Conc: Concentration

Others: as noted (Degrees, Certificates, etc.)

Architecture	PC	HC		
Anthropology	H	HC		
Art History	P	PC	H	HC
Biology	P	PC	H	HC
Business	B.Com.			
Canadian Studies*	P	PC	HC	
Classical Civilization	P	PC	H	HC
Computer Mathematics	P	H		
Criminology and Criminal Justice	Conc.**			
Directed Interdisciplinary Studies	P	H		
Economics	P	PC	H	HC
English	P	PC	H	HC
English Language and Composition	C.E.L.C.			
Teaching English as a Second Language	C.T.E.S.L.			
Film Studies	P	PC	H	HC
French	P	PC	H	HC
French Language Studies	C.F.L.S.			
French Translation Studies	C.F.T.S.			
Geography	P	PC	H	HC
German	P	PC	H	HC
Greek	P	PC	H	HC
History*	P	PC	H	HC
Italian	P	PC	HC	
Journalism	HC	B.J.		
Latin	P	PC	H	HC
Law**	P	PC	H	HC
Law Enforcement	C.L.E.S.			
Linguistics*	P	PC	H	HC
Mass Communication	P	PC	H	HC
Mathematics	P	PC	H	HC
Music	P	PC	H	HC
	B.Mus.,	Dip.M.		
Operations Research		H		
Philosophy*	P	PC	H	HC
Political Science*	P	PC	H	HC
Public Administration*	B.P.A.			
Public Service Studies	C.P.S.S.			
Psychology**	P	PC	H	HC
Religion	P	PC	H	HC
Russian	P	PC	H	HC
Sociology	H	HC		
Sociology/Anthropology**	P	PC		
Soviet and East European Studies	H	HC		
Spanish	P	PC	H	HC
Statistics	P	PC	H	
Women's Studies	PC	HC		

* Mention: français, (see 7.7)

**A concentration in Criminology and Criminal Justice is offered in a Pass or Honours program in conjunction with specialization in Law, Psychology, or Sociology/Anthropology, or any combination of two of these three disciplines.

4.2 Declaring a Major Discipline

(a) Disciplines Offered as Separate Degrees

Students normally apply to be admitted directly to the first year of disciplines offered as separate degrees (B. Com., B.J., B.Mus., B.P.A.). Students may apply to transfer into or out of these programs, but as most of these programs are subject to enrolment limitations, entry will be competitive. Consult the appropriate departmental entries for further details. The transfer procedure is described in section 2.3.

(b) Disciplines Offered as Majors in the B.A. Programs

Although not required to do so, students admitted to the Pass B.A. program may declare their proposed major or specialization(s) on admission to First year, but in any case they are expected to declare their Major discipline(s) prior to registration in Second year. Students who have not done so must obtain special permission from the Registrar to register.

Students admitted to the Honours B.A. program must declare their major specialization(s) by the time of their first registration.

Students in the Third or Fourth year of a Pass or Honours B.A. program who have not declared a Major discipline will be denied permission to register. Where their performance is inadequate to permit them to declare any Major, they will be debarred from the university.

Students may apply to declare/change their Major discipline at the Faculty Registrar's Office, 312 Paterson Hall. Please contact the office for application deadlines.

(c) B.A. (Directed Interdisciplinary Studies)

Students should apply for admission to the program after completing First year, or if transferring from another program, before their final five credits. The proposed program must be approved by the members of the Committee on Directed Interdisciplinary Studies. For details of the Pass and Honours programs, see p. 104.

Application forms are available from the Director of the program and must be submitted to the Registrar's Office before July 1 for September registration and before November 1 for January registration.

4.3 Grade-Point Average for Entry and Continuation in a Major

The Grade-Point Average (GPA) for entry into and continuation in a major discipline will be calculated over all successful attempts in courses in that discipline. Where the record includes supplemental or grade-raising examinations and/or repeated courses, only the last attempt will be included in this GPA. Forfeited courses will be excluded from the calculation.

This GPA will be calculated to one decimal place and will not be rounded.

Some programs have special conditions for entry and continuation. (See 4.4 and 4.5).

4.4 Standards for Declaring a Major

In the Pass B.A. program, to be accepted into a major discipline in a program not subject to Senate-approved enrolment limitations, students entering Second or Third year must have completed at least one course leading to the major discipline and have achieved a GPA of at least 4.0 in that Major discipline (see 4.3).

In the Honours programs, to be accepted into a major discipline not subject to Senate-approved enrolment limitations, students entering Second or Third year must have

completed at least one course leading to the major discipline and have achieved a GPA of at least 6.0 in that major discipline. Students entering Fourth year must have a GPA of 6.5 in the Major discipline (see 4.3).

Students declaring a Combined Major must meet the foregoing requirements in each proposed major discipline.

Special standards apply to programs with Senate-approved enrolment limitations. Currently the programs subject to limitations are Business, Criminology and Criminal Justice, Journalism, Mass Communication and Public Administration. Consult the departmental entries for these disciplines for details of the standards that must be met by students wishing to qualify for consideration.

4.5 Continuation in a Major

Students pursuing a degree with a Combined Major must fulfil the requirements in each individual Major discipline.

In programs with enrolment limitations, however, special standards for continuation may apply. Consult the departmental calendar entries for Business, Criminology and Criminal Justice, Journalism, Mass Communication and Public Administration.

Pass B.A. Program

To continue in their Major discipline(s), students in the Pass B.A. program must maintain a GPA of at least 4.0 in the Major discipline(s).

Honours Programs

To continue in their Major discipline(s), students in the Second or Third year of Honours programs must maintain a GPA of at least 6.0 in the Major discipline(s). To proceed into and continue in Fourth year, students in Honours programs must have and maintain a GPA of at least 6.5 in the major discipline(s).

4.6 The Honours Thesis or Research Essay

General

Although the scope of the Honours Research Essay or Thesis should not exceed what the student can reasonably expect to complete within an academic session, up to two re-registrations are permitted. If the thesis is not completed within three consecutive sessions, a grade of *F* will be assigned. (Students who first register in September must submit the finished thesis by April 1 of the following Fall/Winter session.)

The First re-registration is optional. Students should note, however, that they are not eligible for supervision or library privileges, may not submit a thesis for grading, and may not graduate if they are not registered.

The Second re-registration is compulsory for students whose theses are still outstanding at the beginning of the third session. To avoid such re-registration students must either:

- (a) withdraw from the Honours program, notifying the Registrar's Office of their intention in writing, no later than the last date for late registration; or
- (b) notify the Registrar's Office of intention to complete the Honours program by means of appropriate alternative courses approved by the Honours supervisor.

Withdrawal

Students may withdraw from the Honours thesis up to the last date for withdrawal from full courses in the session. Students who withdraw during their initial registration will retain Honours status. Students who withdraw from a re-registration will forfeit Honours status, unless they simultaneously transfer to another course or courses that meet Honours requirements. Students who withdraw from the Honours program will automatically be withdrawn from the Honours thesis.

Reinstatement

Students who forfeit Honours status, either by withdrawing from the thesis or by obtaining an *F* grade for non-completion, may apply for reinstatement in the Honours program.

Thesis or Essay Registration and Re-registration

The following table sets out a typical registration, re-registration schedule for a student registering in a thesis for the first time in September. Please note that there is a late fee payment assessed during the late registration period. (For information about fees, see pp. 42-45.)

Registration	Deadline*	Fee	Deadline for Submission of Completed Thesis*	Grade if not Complete	Deadline for Withdrawal from Thesis*
Initial Registration	Last day for late registration (Sept.)	fee per credit	June 1 (April 1 for Spring graduation)	<i>IP</i>	Last day for withdrawal from full courses (Mar.)
First Re-registration**	Last day for late registration for Summer session Day division (July)	fee per half credit	Sept. 15	<i>IP</i>	Last day for withdrawal from Summer session Day division full courses
Second Re-registration	Last day for Late registration (Sept.)	fee per half credit	April 1	<i>F</i>	Last day for withdrawal from full courses (Mar.)

* Consult "The Academic Year" applicable to each year, for precise dates (see pp. 8-9.)

**Optional — see 4.6 General

to the Committee on Admissions and Studies. Reinstatement is not guaranteed. The department may require such students to begin a new project. Reinstated students will pay a full registration fee.

5. Academic Standing

5.1 Standing in Courses

Standing in courses is shown by alphabetical grades as described on p. 38. Supplemental examinations are graded by the same scale.

In addition the following symbols apply in the Faculties of Arts and Social Sciences:

Abs

Absent from formally scheduled final examinations where the necessary term work has been completed. (This grade bears academic penalty in that it is interpreted as an unsuccessful attempt.)

Aeg

Pass standing is granted on the basis of course work when no further assessment is considered feasible. Aegrotat is granted only by approval of the Joint Committee on Admissions and Studies in response to a student's application. (See also 6.3 and p. 39.)

Aud

Audit indicates courses not taken for academic credit.

Ch

Credit granted under the Challenge for Credit policy.

Def

Final grades deferred for personal or medical reasons with approval of the Joint Committee on Admission and Studies. This notation must be replaced by a grade within the prescribed time period or it will revert to a failure with no academic credit.

F

Failure, no academic credit.

FNS

Failure without access to supplementals. No academic credit.

IP

Honours thesis or essay is "In Progress". (See 6.5).

Sat

Satisfactory

Uns

Unsatisfactory

The 12-grade-point system is set out on p. 38. The grade points earned in any specific course are determined by multiplying the grade points corresponding to the grade by the credit value of the course. Thus an A+ in a half-credit course will earn the student six grade points, while A+ in a two-credit course would be worth 24 grade points.

5.2 Academic Standing

Performance of all students will be evaluated regularly to determine whether they are meeting the standards

prescribed for continuing in the program. Performance will be classified according to the following three categories:

Good Standing

Students in Good Standing fully meet the academic standards prescribed for their degree program and are eligible to continue in that program.

Probation

Students placed on Probation are deficient with respect to the academic standards prescribed for their degree program. They may continue in their degree program but must clear Probation at the time of the next Academic Standing decision.

Debarred from Further Study

Students whose performance falls below a minimum standard will be debarred. Students who are debarred will not be allowed to register at Carleton University.

5.3 Schedule of Academic Standing Evaluations

The first evaluation of Academic Standing will take place at the end of the session of registration in which students have accumulated a total of at least four attempts.

Subsequent evaluations will take place at the end of each successive session of registration, providing that students have made at least two attempts since the previous Academic Standing decision.

5.4 Continuation Index (CI)

Academic Standing decisions will be based in part on the Continuation Index (the CI).

The Continuation Index is calculated by dividing the total grade points accumulated over all attempts by the total number of attempts. The calculation is carried to two decimal places without rounding.

Since the passing grades of *Ch*, *Sat* and *Aeg* do not generate grade points, courses with these grades and the attempts associated with them will be ignored in the calculation of the CI, although they will continue to count toward the total attempts allowed in the degree or certificate program. Audited courses will be excluded from both calculations.

5.5 Attempts

Every grade which appears on the official transcript constitutes an attempt. Such grades include not only those for successfully completed courses but also those for all failed, forfeited, replaced and repeated courses, as well as grades received from supplemental or grade-raising examinations.

Audited courses and courses from which a student withdraws in good standing are not considered to be attempts.

Attempts are weighted according to the credit value of the course.

5.6 Limit on Attempts

Students in the Pass B.A. program may not accumulate more than 23 attempts in the process of earning their degree. Students who accumulate more than 8 unsuccessful attempts will be debarred.

Students in Honours programs may not accumulate more than 26 attempts (26.5 in the Journalism programs) in the process of earning their degree. Students who accumulate more than 6 unsuccessful attempts (6.5 in Journalism

programs) must withdraw from Honours and may be debarred. (see 5.8)

Students in five-credit certificate programs may not accumulate more than 7 attempts in the process of earning their certificate. Similarly, students in a six-credit certificate program may not accumulate more than 8 attempts. Students in certificate programs who accumulate more than 2 unsuccessful attempts will be debarred.

5.7 Academic Standing in the Pass B.A. Program

Good Standing

Students in the Pass B.A. program will be in Good Standing if at the time of any Academic Standing decision:

- (a) their CI over all attempts is at least 4.00;
- (b) they have accumulated no more than 23 attempts including current registration, i.e., they have no more than 8 unsuccessful or forfeited attempts;
- (c) the GPA in each major discipline is at least 4.0.

Probation

Students in the Pass B.A. Program will be placed on Probation if, at the time of any Academic Standing decision, their CI is less than 4.00 but greater than or equal to the value in the table in Section 5.9 which corresponds to the total number of attempts in their academic record. Students in this position are eligible for Probation only if they have satisfied the appropriate regulations governing standing in a major.

Students placed on Probation will immediately forfeit all passed courses with grades of less than C- accumulated during the evaluation period which resulted in Probation.

Students on Probation must clear probation at the time of the next Academic Standing decision by achieving a CI of at least 4.00 over all attempts accumulated during the period of Probation. Students failing to meet this standard will be debarred.

The CI for all subsequent decisions concerning academic standing and graduation will be calculated over the attempts accumulated after being placed on Probation. Attempts accumulated prior to the Probation decision, however, will continue to be counted in the total allowed for the degree, as will forfeited courses.

Students may not go on Probation more than once. If the CI falls below 4.00 a second time, the student will be debarred.

Debarred from Further Study

Students in the Pass B.A. program will be debarred if:

- (a) at the time of any Academic Standing decision, their CI is less than the value in the Table in Section 5.9 corresponding to the number of attempts in their record;
- (b) having been placed on Probation, they fail to achieve Good Standing at the time of the next Academic Standing decision;
- (c) having cleared Probation, they subsequently fail to maintain Good Standing;
- (d) they fail to qualify for graduation within 23 attempts, including current registration, or they have more than 8 unsuccessful or forfeited attempts;
- (e) on entering Second year, they have not successfully declared a Major and have failed to qualify for permission to register as an Undeclared Major;
- (f) on entering Third Year, they have not successfully declared a Major;
- (g) having declared a Major discipline, they fail to maintain standing in that major after First year and do not qualify to declare another in its place, and have not been granted special permission to register undeclared (see 4.2).

5.8 Academic Standing in the Honours B.A., B.Com., B.J., B.Mus., and B.P.A. Programs

Good Standing

Students in Honours programs will be in Good Standing if at the time of any Academic Standing decision:

- (a) their CI over all attempts is at least 6.00;
- (b) they have accumulated no more than 26 attempts (26.5 in Journalism programs) including current registration (i.e., they have no more than 6 unsuccessful or forfeited attempts);
- (c) in Second or Third year, they have a GPA of 6.0 or more in each major discipline;
- (d) in Fourth year, they have a GPA of 6.5 or more in each major discipline.

Probation

Students in Honours programs will be placed on Probation if, at the time of any Academic Standing decision, their CI is less than 6.00 but greater than or equal to the value in the table in Section 5.9 which corresponds to the total number of attempts in their academic record. Students in this position are eligible for Probation only if they have satisfied the appropriate regulations governing standing in a major.

Students whose performance does not qualify for Good Standing in Honours but does meet or exceed the minimum standard for Good Standing in a Pass B.A. program may apply to transfer to that program. If their transfer is accepted, they will not be placed on Probation but will qualify for Good Standing.

Students who are placed on Probation will immediately forfeit all passed courses with grades of less than C- accumulated during the evaluation period which resulted in Probation.

Students who are placed on Probation must clear Probation at the time of the next Academic Standing decision by achieving a CI of at least 6.00 over all attempts accumulated during the period of Probation.

The CI for all subsequent decisions concerning Academic Standing and graduation will be calculated over the attempts accumulated after being placed on Probation. Attempts accumulated prior to the Probation decision, however, will continue to be counted in the total allowed for the degree, as will forfeited courses.

Students may not go on Probation more than once. If the CI falls below 6.00 a second time, students will be debarred.

Students who fail to clear Probation at the time of the next Academic Standing decision and whose CI based on performance during the Probation period is below the minimum required for Good Standing in the Pass B.A. program, will be debarred.

Students who fail to clear Probation at the time of the next Academic Standing decision and whose performance during the Probation period nonetheless meets or exceeds the minimum required for Good Standing in the Pass B.A. program may apply to transfer to that program. If their transfer is accepted, forfeited courses with grades of C or C- accumulated during the evaluation period which resulted in Probation will be restored and students will be placed in Good Standing in the Pass B.A. Program. If they fail to maintain Good Standing thereafter, they will be debarred.

Debarred from Further Study

Students in the Honours programs will be debarred if:

- (a) at the time of any Academic Standing decision, their CI would lead to debarment if they were in the Pass B.A.

program;

(b) having been placed on Probation, they fail to achieve Good Standing at the time of the next Academic Standing decision;

(c) having cleared Probation, they subsequently fail to maintain Good Standing;

(d) they fail to qualify for graduation within 26 attempts (26.5 in Journalism programs) including present registration, (i.e., they have more than 6 unsuccessful or forfeited attempts, 6.5 in Journalism programs);

(e) on entering Second year, they have not successfully declared a Major and have failed to qualify for permission to register as an Undeclared Major;

(f) on entering Third year, they have not successfully declared a Major discipline;

(g) having declared a Major, they fail to maintain standing in that Major and do not qualify to declare another in its place.

5.10 Readmission after Debarment

After two years' absence from post-secondary studies, students who have been debarred may petition the Joint Committee on Admissions and Studies for readmission to the University. Each case will be considered individually on its merits and readmission is not guaranteed.

5.9 Table of Minimum CIs for Probation

ATTEMPTS	PASS DEGREE	HONOURS B.A., B.Com., B.J., B.Mus., B.P.A.
4.0	2.00	4.50
4.5	2.00	4.50
5.0	2.00	4.50
5.5	2.10	4.55
6.0	2.20	4.60
6.5	2.30	4.65
7.0	2.40	4.70
7.5	2.50	4.75
8.0	2.60	4.80
8.5	2.70	4.85
9.0	2.80	4.90
9.5	2.90	4.95
10.0	3.00	5.00
10.5	3.10	5.05
11.0	3.20	5.10
11.5	3.30	5.15
12.0	3.40	5.20
12.5	3.50	5.25
13.0	3.60	5.30
13.5	3.70	5.35
14.0	3.80	5.40
14.5	3.90	5.45
15.0	4.00	5.50
15.5	4.00	5.55
16.0	4.00	5.60
16.5	4.00	5.65
17.0	4.00	5.70
17.5	4.00	5.75
18.0	4.00	5.80
19.0	4.00	5.90
19.5	4.00	5.95
20.0	4.00	6.00
20.5 or more	4.00	6.00

For any specified number of attempts, a CI less than the tabled value means that the student will be Debarred from further study.

5.11 Accelerated Progress

Students admitted to Qualifying-University year may have some or all of the courses taken in Qualifying-University year count toward the degree if they:

- (a) have completed at Carleton one year's full-time study;
- (b) have no failures or grade-raising examinations on their record; and
- (c) present a minimum *B-* (7.0 average) on five credits or a total of 35 grade points.

6. Examinations

General regulations on examinations are on p. 39-40. In addition the following regulations apply to students in the Faculties of Arts and Social Sciences.

6.1 Eligibility

- (a) No student may write supplemental and/or grade-raising examinations in more than two credits in any academic session.
- (b) Students on Probation may not write supplemental or grade-raising examinations.

6.2 Supplemental Examinations

Supplemental examinations are available in all undergraduate courses with written final examinations for those undergraduate students who are in Good Standing and have not been disqualified from such by receiving the grade of *FNS* or *Abs*.

Both the initial failure and the supplemental grade are included in the calculation of the CI.

Application forms are available at the Registrar's Office. Check for application deadlines under Academic Year, pp. 8-9.

6.3 Deferred Examinations and Final Papers

Students who are unable to write a final examination or complete a final paper because of illness or other circumstances beyond their control may *apply within 14 days* to the Faculty Registrar's Office for permission to write a deferred examination or extend a term paper deadline. Permission can be granted only if the absence is fully and specifically supported by a medical certificate or other documents.

Deferred examinations are not granted to students who make travel plans that conflict with the examination period.

Application for Aegrotat standing (*Aeg*) must be made to the Registrar's Office, 312 Paterson Hall and will be granted in exceptional circumstances only where no other assessment is considered feasible and only if term work has been of high quality. *Aeg* indicates only a passing standard.

6.4 Grade-Raising Examinations

Grade-raising examinations will not normally be available in courses without written final examination. No more than three credits' worth of grade-raising examinations may be written in any degree program (including Qualifying University year).

While both grades will appear on the transcript, the grade awarded as a result of the grade-raising examinations will be considered to be the final grade whether it is higher or lower than the original grade. Both grades, however, will be included in the calculation of the CI.

Application forms are available at the Faculty Registrar's Office. Check for application deadlines under the Academic Year, pp. 8-9.

6.5 Review of Grades

Students wishing to receive a review of a final grade must apply at the Faculty Registrar's Office within 14 days of the official release of grades for the term. A review may raise or lower a grade, or leave it unchanged. Students awaiting the outcome of a review must still apply for any supplemental examination by the prescribed deadline.

The following procedures apply:

1. A review of grade is available to all students in all assignments and examinations. Reviews are conducted by the instructor assigned to the course.
- (a) A review of final grade is limited to final examinations and final term papers returned after the last day of classes. Application must be filed in the Faculty Registrar's Office, Arts and Social Sciences, within 14 days of the official release of grades for the term.
- (b) Students must request a review of other assignments and tests by contacting the instructor directly within 14 days of the return of the graded assignment, test or examination.
2. An *appeal* of a grade may be made to a Chairman/Director or Dean when a student specifies reasons suggesting uncorrected error in the grade assigned by an instructor. The reconsideration of the written work in the course will be assigned by the Chairman/Director to at least one qualified reader.

The appeal is specific to the grade on a given test/examination or paper, and more than one assignment may be appealed by a student within 14 days of the result.

6.6 Repeated Courses

Students may repeat a course for which they have received a passing grade. The grade awarded on the repetition will be considered to be the final grade whether higher or lower than the original grade. Both grades, however, will be included in the calculation of the CI.

7. Graduation

7.1 Application to Graduate

Students expecting to graduate in the Spring must make application on the form available in the Faculty Registrar's Office by February 1; those expecting to graduate in the Fall, by September 1; and those expecting to graduate in February, by December 1.

See also University Graduation Requirements, pp. 38-39.

7.2 Graduation Grade-Point Averages

Grade-Point Averages for graduation will be calculated to one decimal place (not rounded) over the successfully completed courses counting towards the degree. Where the record contains more than one attempt in a course counting towards the degree, only the last attempt will be included in the graduation GPA.

GPA in the Major Discipline

The graduation GPA in the Major discipline will be calculated over successfully completed courses in the Major discipline. Consult the departments for details.

Overall GPA

The overall GPA for students graduating in Honours is calculated over all the courses required for the degree.

7.3 Graduation Requirements, Pass B.A. Degree

Candidates for Graduation must have the following:

- (a) fifteen credits, not including any credits used to meet Qualifying-University year requirements;
- (b) a CI of at least 4.00;
- (c) a minimum of 8 credits beyond the 100 level;
- (d) the program requirements of the Major discipline(s) (consult the departmental entries);
- (e) a minimum GPA of 4.0 in each Major discipline and concentration;
- (f) no more than 23 attempts (i.e., no more than 8 unsuccessful or forfeited attempts);
- (g) sufficient Carleton credits to meet the residence requirement (see 3.12).

In addition, students must be recommended by their Major discipline(s).

7.4 Graduation with Distinction

To qualify for Graduation with Distinction, students in the Pass B.A. Degree program Must:

1. complete the Pass B.A. program within a maximum of 17 attempts; (where there are additional attempts consisting of courses designated as "Extra to Degree", the student will not necessarily be disqualified, see Regulation 4);
2. have maintained Good Standing throughout their degree studies;
3. present a minimum of 10 credits taken at Carleton;
4. achieve an overall Grade-Point Average of 9.5. This Grade-Point Average will be calculated over all successfully completed courses presented for the degree, including all courses "Extra to Degree" in excess of the 17 permitted attempts.

7.5 Graduation Requirements, Honours B.A., B.Com., B.J., B.Mus., B.P.A.

Candidates for Graduation must have the following:

- (a) 20.0 credits (20.5 for the Journalism programs), not including any credits used to meet Qualifying-University year requirements;
- (b) a CI of at least 6.00;
- (c) a minimum of 11 credits beyond the 100 level, 11.5 in Journalism programs, 13 in B.Com. and in B.A. (Hons). programs in Mathematics and Statistics;
- (d) the program requirements of the Major discipline(s) (consult the departmental entries);
- (e) a minimum GPA of 6.5 in each Major discipline and concentration;
- (f) no more than 26 attempts (26.5 in Journalism programs), i.e., no more than 6 unsuccessful or forfeited attempts;
- (g) sufficient Carleton credits to meet the residence requirement (see 3.12).

In addition, students must be recommended by their Major disciplines.

• 7.6 Classes of Honours

For students who entered Honours in or after the session beginning September, 1980, three classes of Honours degrees are awarded according to grade-point averages attained:

- (a) Highest Honours: 10.0 in the Honours subject and 8.0 overall.

(b) High Honours: 9.0 in the Honours subject and 7.0 overall.

(c) Honours: 6.5 in the Honours subject and 5.0 overall.

Departments may recommend the next higher class of Honours degree when a student has one average in the appropriate higher range and the other within 0.2 grade points of the higher range.

To determine the class of Honours degree for students in Combined Honours programs the average is taken in each of the two subjects, and the simple average of the two is used.

7.7 Mention: français

Students registered in certain Pass and Honours programs may earn the notation "Mention: français" by completing part of their Pass/Honours requirement in French and by demonstrating a knowledge of the history and culture of French Canada. The general requirements are as follows. For more specific details consult the departmental entries.

Students in a Pass program must present one credit in French and one credit devoted to the history and culture of French Canada. In addition, one 200- or 300-level credit in the Major discipline must be taken in French.

Students in an Honours program must present one credit in French language and one credit devoted to the history and culture of French Canada. In addition, one 200- or 300-level credit and one 400-level credit in the Honours discipline must be taken in French.

Students in Combined programs must fulfill the "Mention: français" requirement in both disciplines.

Courses taught in French in the Major discipline may be taken at Carleton, at the University of Ottawa on the Exchange Agreement (see 3.8), or at a francophone university on a Letter of Permission (3.10). Students planning to take courses on exchange or on a Letter of Permission should take careful note of the residence requirement for a minimum number of Carleton courses in their Pass or Honours programs (3.13).

8. The Qualifying-University Year and First-Year Curriculum

8.1 Qualifying-University Year

Students in Qualifying-University year must present five credits, which must include two of:

- (a) a 100-level course in English;
- (b) Mathematics 69.007★ and 69.017★;
- (c) a language other than English.

The five Qualifying-University-year credits are in addition to the regular degree requirements.

Students planning to apply for admission to other programs (i.e., B.J., B.Mus., B.Com.) should ensure that they take appropriate prerequisite courses. All Qualifying-University-year students should familiarize themselves with the provisions for Accelerated Progress and ensure that their choice of courses will permit them to proceed into Second year should they qualify.

8.2 Distribution of Courses in First Year

To ensure that students in the Faculties of Arts and Social Sciences will be in a reasonable position to meet the requirement to declare a Major no later than Second year,

they are required to include a minimum number of courses leading to a Major in their first five attempts.

First-year students in the Pass or Honours B.A., B.J. or B.P.A. program must include in their program at least one course leading to a Major discipline (see below) in each of three departments, schools or interdisciplinary areas within the Faculties of Arts and Social Sciences. Students should include in their First-year registration any course that is required for their prospective Major discipline and should be aware that many upper-year courses stipulate prerequisites. Students in the B.J. and B.P.A. must also meet the First-year prescriptions of their programs.

Students in the B.Com. and B.Mus. programs must meet the First-year prescriptions of their programs and must include at least one course leading to a Major discipline from each of two different departments, schools or interdisciplinary areas within the Faculties of Arts and Social Sciences.

The courses open to First-year students which fulfil this requirement are:

Art History 11.100, 11.115★, 11.120★, 11.121★
 Biology 61.102, 61.209★, 61.230★
 Canadian Studies 12.100
 Classical Civilization 13.100, 13.102★, 13.103★, 13.119
 Economics 43.100
 English 18.100, 18.101, 18.105, 18.162
 Film Studies 19.100
 French 20.111, 20.112, 20.161, 20.162, 20.163
 Geography 45.101, 45.102★, 45.103★
 German 22.111, 22.115, 22.120, 22.205, 22.206
 Greek 15.105★, 15.106★, 15.115
 History 24.100, 24.101, 24.102, 24.130
 Italian 26.100, 26.101★, 26.102★
 Journalism 28.100 (B.J. only)
 Latin 16.105★, 16.106★, 16.115
 Law 51.100
 Linguistics 29.100
 Mass Communication 27.111
 Mathematics 69.102 (69.107★ and 69.207★), 69.112 (69.117★ and 69.217★)
 Music 30.100, 30.150★, 30.151★
 Philosophy 32.101★, 32.102★, 32.103★, 32.106★, 32.107★, 32.150, 32.160, 32.184★
 Political Science 47.100
 Psychology 49.100
 Religion 34.102★, 34.103★, 34.105★, 34.106★, 34.107★, 34.108★, 34.109★, 34.112★, 34.202
 Russian 36.100, 36.120
 Social Work 52.100
 Sociology/Anthropology 53.100, 54.100, 56.100
 Spanish 38.115, 38.120, 38.150

8.3 Course Selection

Subject to the provisions of 8.1 and 8.2 and placement requirements, Qualifying-University and First-year students can choose 100-level courses from all departments in Arts, Social Sciences, and Science. In addition, some departments will allow First-year students to take certain courses numbered 200.

While the University makes every effort to allow students to enrol in courses of their choice, enrolments may have to be limited in certain of the more popular courses.

Paterson Hall, Room 215
Telephone: 788-6613

Officers of Instruction

See also Centre for Applied Language Studies, p. 422.

Director
Ian Pringle

Co-ordinator of ESL, Intensive Programs
Devon Woods

Co-ordinator of ESL, Credit Programs
Trudy O'Brien

Assistant Professors
Devon Woods
Lynne Young

Instructors
George Chouchani
Patricia Currie
Trudy O'Brien

English Language Teachers
Robert Ahad
Kathy Au Coin
Geri Dumouchelle
Janna Fox
Andi Gray
Linda Librande
Catherine MacNeil
Clare Myers
Renata de Pourbaix
Tim Pychyl
Adrienne Soucy
Marilyn Weir

Japanese Language Instructors
Katsuhiko Mori
Satoko Mori

Mandarin Chinese Language Instructor
Han Hongju

Hebrew Language Instructor
To be announced

Arabic Language Instructor
George Chouchani

Indonesian/Malaysian Language Instructor
To be announced

English as a Second Language Unit

Course Information

The courses are designed to meet the needs of students who are qualified for admission to any faculty but whose native language is not English, and whose scores on the Carleton Assessment of English as a Second Language or other tests recognized by the University indicate they would encounter serious difficulties in a full academic program. No student who has native or native-like command of English is permitted to take any of these courses.

The aim of these courses is to train students for university work. E.S.L. 21.130 is specifically for Canadian residents and citizens who have had little or no previous experience with academic English. The focus for the Intermediate English (E.S.L. 21.150) and Advanced English (E.S.L. 21.190) is on listening to lectures and extended discourse, note-taking, writing essays and papers and participating in group seminar work. E.S.L. 21.195 is a similar course but is concerned specifically to address the needs of students in the Faculty of Engineering. The focus in Advanced Writing (E.S.L. 21.196★) is specifically related to developing skill in preparing, writing, revising and editing papers and reports for academic and professional purposes.

Placement in these courses is determined by the Carleton Assessment of E.S.L. No challenges for credit can be made for credit in E.S.L.

Courses Offered

English as a Second Language 21.130 Introductory English as a Second Language for Academic Purposes

For students who are eligible for admission to Carleton University as full-time students, but have little or no experience with academic English. The course focuses first on general proficiency in English, and second on proficiency in English for academic purposes, with a strong emphasis on those skills necessary for success at University. Not open to visa students.

Day division, Fall and Winter terms: Nine hours a week (one term).

English as a Second Language 21.150 Intermediate English as a Second Language for Academic Purposes

For students with basic grammatical and oral competence in English but only limited experience in using English for academic purposes. This course helps to develop skills in understanding and producing appropriate English in an academic setting. Work is done on effective reading, listening to lectures, note-taking, researching and writing essays and reports, and participating in group seminars.

Day division, Fall and Winter terms: Six hours a week (one term).

English as a Second Language 21.190 Advanced English as a Second Language for Academic Purposes

For students with fairly good command of English who need further language support in the area of academic studies. There is a focus on increasing the effectiveness and speed of reading and on the understanding of complex oral and written texts. Extensive work is done on the developing of research skills, on the organization and writing of essays, and on the preparation and presentation of oral reports.

Day division, Fall and Winter terms: Six hours a week (one term).

English as a Second Language 21.195 Advanced English as a Second Language for Engineering Students

For students of Engineering and Industrial Design with a fairly good command of English who need further language support in the area of academic studies and communication for Engineering purposes. There is a focus on: (i) reading Engineering text, e.g. case studies, project descriptions, and relevant academic materials, (ii) listening to lectures, reports and presentations, (iii) writing for Engineering, i.e.

projects, summaries, laboratory reports, administrative/business communications, (iv) making oral presentations.

Day division, Fall and Winter terms: Three hours a week (two terms).

English as a Second Language 21.196★

Advanced Writing for English as a Second Language

For advanced second-language students who need the ability to write academic papers in English, and who wish to develop effective methods for doing so. This course focuses on strategies for generating ideas; combining, organizing, and structuring information from several sources; and expressing ideas effectively, clearly and grammatically.

Day division, Fall and Winter terms: Three hours a week (one term).

Other Languages

Course Information

In addition to E.S.L. courses, the Centre for Applied Language Studies assumes the responsibility for teaching the University's credit courses in Mandarin Chinese, Japanese, Arabic, Indonesian/Malaysian and Hebrew. Most of these courses are intensive courses, requiring eight hours of class time per week in addition to regular laboratory and other out-of-class assignments.

Courses Offered

Mandarin 23.110

Intensive Introductory Mandarin (two credits)

An intensive course designed for students with little or no knowledge of Mandarin. The course includes an introductory section on "survival" oral Mandarin. The remainder of the course aims to ensure a basic grasp of Mandarin pronunciation and syntax, and basic oral comprehension, reading, writing and composition.

Not open to students already literate in Chinese (whether native speakers of Cantonese, Fukien, Hakka, etc.) Non-literate speakers of Chinese languages will be subject to a placement test which may rule them inadmissible to the course.

Eight hours a week.

Japanese 23.120

Introductory Japanese (two credits)

An intensive introductory course in spoken and written Japanese. The course includes an introductory unit on "survival" oral Japanese. The remainder of the course aims to ensure a basic grasp of Japanese morphology and syntax, with equal weight given to oral comprehension, speaking, reading, writing and composition.

Eight hours a week.

Arabic 23.130

Intensive Introductory Arabic (two credits)

An intensive introduction to Modern Standard Arabic designed for students with little or no knowledge of Arabic. The course teaches intermediate spoken proficiency in one of the major dialects of spoken Arabic, familiarizes student with written forms of Modern Standard Arabic, and teaches introductory composition. Not open to native speakers of Arabic.

Eight hours a week.

Indonesian and Malaysian 23.140

Introduction to Indonesian/Malaysian

An introduction to the standard language of Indonesia and Malaysia. The course aims to ensure a basic grasp of the syntax and morphology of Bahasa Indonesia and Bahasa Malaysia, with an emphasis on speaking and listening. Not open to native speakers of Bahasa Indonesia and Bahasa Malaysia.

Four hours a week.

Hebrew 23.150

Modern Spoken Hebrew (two credits)

An intensive introduction to Modern Hebrew, with emphasis on speaking and listening.

Eight hours a week.

Department of Art History

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Dunton Tower, Room 2201
Telephone: 788-2342

Officers of Instruction

Chair

Roger Mesley

Supervisor of Honours Programs

David Goodreau

Supervisor of Pass Programs

Roger Mesley

Adviser to Architecture/Art History Combined Majors

Kelly Crossman

Professor Emeritus

George Swinton

Professor

Clifford M. Brown

Associate Professors

David Goodreau

Diane le Berrurier

Natalie Luckyj

Roger Mesley

Ruth Phillips

James Thompson

Assistant Professor

Kelly Crossman

Adjunct Professors

Rosemarie Bergmann

Jean Sutherland Boggs

Ted Brasser, *Canadian Museum of Civilization*

Lilly Koltun, *National Archives of Canada*

Research Associates

James Burant, *National Archives of Canada*

Gerald McMaster, *Canadian Museum of Civilization*

Slide Curator

Barbara Stevenson

Sessional Lecturers

Eva Major-Marothy

Melissa Rombout

Barbara Stevenson

General Information

The Department offers a wide range of courses, primarily in the history of Western art. Consequently, Pass and Honours programs in Art History are flexible, and within the context of these degree programs students are encouraged to take courses in other departments of the Faculty of Arts such as Classics, History, languages and literatures, Music, Philosophy and Religion, as well as in the Faculties of Science and Social Sciences.

Within the requirements for Pass and Honours degrees, students are expected to take courses in the areas that form the undergraduate curriculum: Ancient, Medieval, Renaissance, Baroque and Rococo, Romantic, Modern, Contem-

porary, North American and Native Art. Courses in the theory of art and in art criticism are offered as adjuncts to those in art history.

A special feature of the Carleton program is an undergraduate *practicum*, in which degree students in their Third or Fourth year may receive up to one credit in art history for supervised practical experience, working on specific projects in an Ottawa museum or related setting: for example, The National Archives of Canada, The Canadian Museum of Civilization, or The National Gallery of Canada.

Courses in the Faculties of Arts, Science, and Social Sciences provide options that complement art history and support certain specializations or career plans in art history. For example, courses in history, literature, languages and music are related, often directly, to the study of all art historical periods. Courses in film studies relate to contemporary art. Chemistry and/or studio work are especially recommended for students wishing to do post-graduate work in restoration and conservation. Certain offerings in sociology and anthropology are particularly useful for students working in the area of native art.

Pass and Honours students in Art History should consider taking a studio course that acquaints them with techniques and materials that have been applied in the history of art, either through the University of Ottawa exchange agreement (see pp. 37 and 58 of this Calendar) or by means of a Letter of Permission. One credit in studio may be counted as a general option in either the Pass or Honours program. Such courses must be taken in accordance with University policy and must be approved in advance by the Faculty Registrar's Office.

Students from other departments, part-time students and Special students may discover that courses in Art History complement their interests or their programs. Such students may enrol in any course in Art History without the stated prerequisite if permission of the Department has been obtained. Preparatory reading is expected of all students who enrol without the stated prerequisite, and appropriate reading lists are available from the Department secretary throughout the year.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Courses Open to First-Year Students

The following courses are open to First-year students: Art History 11.100, 11.115★, 11.120★, 11.121★, 11.202★, 11.203★, 11.204★, 11.210★, 11.220★, 11.221★, 11.230★, 11.241★, 11.242★, 11.250★, 11.260★, 11.286★, 11.287★.

All students taking an Art History course above the 100 level without the background of Art History 11.100 are strongly advised to prepare themselves by reading a general survey of art history, such as H.W. Janson's *History of Art*, prior to registration in such a course.

Pass Programs

Pass Program in Art History

The Pass degree program is designed for students who wish a liberal arts education with an emphasis on art history. Students who decide that they wish to do graduate work, or who contemplate working in museology, should transfer to the Honours program as early as possible, preferably not later than the end of the Second year.

Courses must be chosen in consultation with the Supervisor of Pass Programs. Six credits in Art History are required, as follows:

1. Art History 11.100;
2. Two of Art History 11.210★, 11.220★, 11.221★, 11.230★, and two of 11.241★, 11.242★, 11.250★, 11.260★;
3. Two and a half additional credits, all above the 200 level, including at least one credit from the areas Antiquity, Medieval and Renaissance, and at least one credit from the areas Baroque and Rococo, Romantic, Modern, Contemporary and North American art.
4. One additional half credit in Art History.

Combined Pass Program

The Combined Pass degree program with other departments in the Faculties of Arts and Social Sciences, requires Art History 11.100 and four additional credits in Art History, of which at least one must be at the 300 level. The Combined Pass degree program with the School of Architecture requires Art History 11.100, 11.120★ and 11.121★, and three additional credits in Art History, of which at least one must be at the 300 level.

Courses in the other department or school must meet the requirements of that department or school. In the case of Architecture, the requirement is at least five approved credits in Architecture (see the approved list below), of which one must be at the 300 level.

Honours Programs

Honours in Art History

The Honours degree in Art History is designed for students contemplating graduate work in art history or museology, or who for other reasons wish to enrich their knowledge through an additional year of concentrated study.

Courses must be chosen in consultation with the Honours Supervisor. Ten credits in Art History are required, as follows:

1. Art History 11.100;
2. Two of Art History 11.210★, 11.220★, 11.221★, 11.230★, and two of 11.241★, 11.242★, 11.250★, 11.260★;
3. Two and a half credits at the 300 level, at least one credit to be taken from the areas Antiquity, Medieval and Renaissance and at least one credit from the areas Baroque and Rococo, Romantic, Modern, Contemporary and North American art.
4. Art History 11.316★;
5. Three and a half credits at the 400 level;
6. One additional half credit in Art History.

Combined Honours

The Combined Honours degree program with other departments in the Faculties of Arts and Social Sciences requires Art History 11.100 and six additional credits in Art History, of which at least two must be at the 400 level. The Combined Honours degree program with the School of Architecture requires Art History 11.100, 11.120★ and 11.121★, and five additional credits in Art History, of which at least two must be at the 400 level.

Courses in the other department or school must meet the requirements of that department or school. In the case of Architecture, the requirement is at least seven approved credits in Architecture (see the approved list below), including one credit at the 400 level.

Approved Architecture Courses

Only the following approved courses in Architecture may be applied toward the architectural component of the combined B.A. degrees: Architecture 76.120★, 76.121★, 76.203★, 76.204★, 76.212★, 76.302★, 76.307★, 76.308★, 76.309★, 76.315★, 76.318★, 76.319★, 76.408★, 76.423★, 76.488★, 77.113★, 77.130★, 77.135★, 77.205★, 77.213★, 77.230★, 77.300★, 77.302★, 77.303★, 77.305★, 77.313★, 77.330★, 77.391A★, 77.420★, 77.440★, 77.488★, 78.350★, 79.320★.

Language Study and Requirements

It is strongly recommended, but not required, that Majors in Art History have the equivalent of at least a First-year course in a language suitable to their program. French 20.106★ or 20.108, German 22.118, Italian 26.100 or 26.105★ and 26.110★ and Spanish 38.115 are recommended.

Honours students are required to demonstrate a proficient reading knowledge of French, German, Italian, or another language relevant to their program. A grade of at least C+ in French 20.106★ or 20.108, German 22.118, Italian 26.100, or 26.105★ and 26.110★, or Spanish 38.115 will be accepted in lieu of a reading examination. If advanced study in art history is contemplated, a reading knowledge at this level is recommended in both French and German, as these are requirements of most graduate schools.

Graduate Study

A Master of Arts program in Canadian Studies, with specialization in Canadian art history, including Canadian native art, is offered through the Institute of Canadian Studies. (For further details see the current Calendar of the Faculty of Graduate Studies and Research.)

Courses Offered

Art History 11.100

A History of Western Art: Prehistory to the Present

This course surveys the art and architecture of the Western World from the Paleolithic era to the present day.

Prerequisites: additional credit for Art History 11.110★ and

11.111★ (no longer offered.)

Day and Evening divisions: Lectures three hours a week.
D. le Berrurier, N. Luckyj, C. Brown, D. Goodreau

Art History 11.115★

Art as Visual Communication

This course addresses the question "What makes a work of art?" A wide variety of visual material is organized topically in order to examine the elements of art (line, shape, value, colour, texture, space), the principles of pictorial organization, the materials and techniques of art, and recurrent tendencies in artistic styles and outlooks. Evening division, Winter term: Lectures three hours a week.
E. Major-Marothy

Art History 11.120★

Introduction to Architectural History: Prehistoric to Medieval

This is an introductory survey of major world traditions in architecture, concentrating on the organizing principles and formal properties of buildings. The course covers ancient and medieval architecture in Europe, Asia and America. Precludes additional credit for Architecture 76.120★. Evening division, Fall term: Lectures three hours a week.
K. Crossman

Art History 11.121★

Western Architecture: Renaissance to the Present

This course examines the architecture of Europe and America from the Italian Renaissance to the modern world. Emphasis is placed on an understanding of the inter-relationship among history, theory and design in the creation of architectural form. Precludes additional credit for Architecture 76.121★. Evening division, Winter term: Lectures three hours a week.
K. Crossman

Art History 11.202★

Canadian Art, Origins to Present

This course surveys Canadian art from the beginning of European settlement to the present. Evening division, Fall term: Lectures three hours a week.
B. Stevenson

Art History 11.203★

Arts of Native Peoples: North America

This course is designed as an introduction to the traditional art and architecture of the native peoples of North America. Supplementary material about Pre-Columbian art and architecture of Meso and South America is also presented as background for the course. Day division, Fall term: Lectures three hours a week.
R. Phillips

Art History 11.204★

Arts of Native Peoples: Africa and Oceania

This course is designed as an introduction to the art forms of the native peoples of tropical Africa, Australia, New Zealand and the tropical islands of the Pacific. Day division, Winter term: Lectures three hours a week.
R. Phillips

Art History 11.210★

Greek and Roman Art and Archaeology

Offered in the Department of Classics as Classical Civilization 13.232★.

Art History 11.220★

Western Medieval Art

The development of Western medieval art from the earliest Christian productions through the late Gothic period is studied, with some reference to Eastern medieval art for purposes of comparison. Evening division, Winter term: Lectures three hours a week.
D. le Berrurier

Art History 11.221★

Eastern Medieval Art

This course examines the sources and the development of the arts in the Byzantine Empire as well as the relationship of its artistic productions to those of neighbouring countries. Day division, Fall term: Lectures three hours a week.
D. le Berrurier

Art History 11.230★

Renaissance Art

This course emphasizes art in Italy from 1400 to 1600, with reference to developments in northern Europe. Evening division, Fall term: Lectures three hours a week.
C. Brown

Art History 11.241★

Seventeenth-Century European Art

This course surveys Baroque painting, sculpture and architecture in Europe during the seventeenth century. Day division, Fall term: Lectures three hours a week. Summer, 1990, Evening division, First term: Lectures six hours a week.
D. Goodreau

Art History 11.242★

Eighteenth-Century European Art

This course surveys Rococo and Early Romantic painting, sculpture and architecture in Europe during the eighteenth century. Day division, Winter term: Lectures three hours a week.
D. Goodreau

Art History 11.250★

Nineteenth-Century European Art

This course surveys the major artists and artistic movements of nineteenth-century Europe. Evening division, Fall term: Lectures three hours a week.
R. Mesley

Art History 11.260★

Twentieth-Century European Art

This course surveys the major artists and movements of twentieth-century Europe. Day division, Fall term: Lectures three hours a week.
N. Luckyj

Art History 11.286★

Art and Ideas: From Ancient Greece to the Twentieth Century

A survey of theories that have shaped the Western approach to art and art criticism, including Plato, Aquinas, Kant, Hegel and Nietzsche. (Also listed as Philosophy 32.286★.) Day division, Fall term: Lectures three hours a week.
J. Thompson

Art History 11.287★

Art and Ideas: the Twentieth Century

A survey of theories that have shaped the Western approach to art and art criticism including formalist, psychological, sociological, phenomenological, semiotic,

poststructural and aesthetic approaches and including such thinkers as Fry, Greenberg, Freud, Arnheim, Hauser, Heidegger and Derrida. (Also listed as Philosophy 32.287★.)

Day division, Winter term: Lectures three hours a week.
J. Thompson

Art History 11.300★

Canadian Painting and Sculpture

This course examines particular aspects of nineteenth- and/or twentieth-century painting and sculpture in Canada. Prerequisite: Art History 11.202★ (or 11.200★ or 11.201★, no longer offered) or permission of the Department.

Not offered 1990-91.

Art History 11.301★

Contemporary Canadian Art

This course examines in depth the art of selected groups and individuals working in Canada from the Second World War to the present.

Prerequisite: Art History 11.202★ or 11.260★, or permission of the Department.

Not offered 1990-91.

Art History 11.302★

Canadian Architecture

Offered in the School of Architecture as Architecture 76.302★.

Prerequisites: Art History 11.100 (or 11.110★ and 11.111★, no longer offered), or 11.120★ and 11.121★, or Architecture 76.120★ and 76.121★.

Art History 11.304★

Pre-Classical Greek Art and Archeology

Offered in the Department of Classics as Classical Civilization 13.331★.

Art History 11.305★

American Architecture

This course studies the cultural history of the United States as expressed through its architectural heritage. Selected buildings and complexes from the earliest settlements through the early twentieth century are examined.

Day division, Fall term: Lectures three hours a week.

D. Goodreau

Art History 11.306★

American Painting and Sculpture

This course studies the evolution of painting and sculpture in the United States from colonial times to the early twentieth century.

Evening division, Fall term: Lectures three hours a week.

D. Goodreau

Art History 11.310★

Etruscan and Roman Art

This course studies Etruscan art and the development of Roman art and architecture through the Constantinian period. (Also listed as Classical Civilization 13.334★.)

Not offered 1990-91.

Art History 11.314★

Inuit Art

This course surveys the prehistoric, historic and contemporary art of the Canadian Inuit with reference to the art of the Eskimos of Alaska and Greenland.

Evening division, Fall term: Lectures three hours a week.

Art History 11.315★

North American Indian Art

This course examines the prehistoric or historic art of the Indian peoples of a selected region of North America. The topic for 1990-91 is *Woodlands Indian Art and Acculturation*.

Prerequisite: Art History 11.203★ or permission of the Department.

Day division, Fall term: Lectures three hours a week.

R. Phillips

Art History 11.316★

History and Methods of Art History

The study of the history of art history and the methodologies and research tools employed by art historians.

Prerequisites: Three credits in Art History including 11.100 11.110★ and 11.111★ (no longer offered) or permission of the Department.

Day division, Fall term: Lectures three hours a week.

R. Phillips

Art History 11.325★

Russian Art

The development of Russian art is studied from its origins into the eighteenth century with an emphasis on Byzantine influences as opposed to local characteristics.

Day division, Winter term: Lectures three hours a week.

D. le Berrurier

Art History 11.327★

Gothic Architecture and Monumental Sculpture

This course investigates the sources and development of Gothic architecture and monumental sculpture in Northern and Southern Europe from its origins in the twelfth century through the fifteenth century.

Prerequisite: Art History 11.220★ or permission of the Department.

Not offered 1990-91.

Art History 11.328★

Gothic Minor Arts

The so-called minor arts of the Gothic tradition from the twelfth through the fifteenth century are studied, including stained glass, manuscripts, tapestries and embroideries, panel painting, goldsmithery and ivory carvings.

Prerequisite: Art History 11.220★ or permission of the Department.

Not offered 1990-91.

Art History 11.330★

Florentine Renaissance Art

This course examines Florentine art in its development from late Trecento ideas to the emergence of the High Renaissance vocabulary.

Not offered 1990-91.

Art History 11.331★

Venetian Renaissance Art

This course examines the art of the Venetian Republic, from the Basilica of San Marco to the emergence of a Renaissance vocabulary with Bellini, Giorgione, Titian, Veronese and Tintoretto, within the context of North Italian painting.

Not offered 1990-91.

Art History 11.332★

Italian Art of the High Renaissance

This course examines the art of the principal representatives of the High Renaissance including Leonardo da Vinci, Michelangelo, Raphael, Titian and the Florentine

circle of Andrea del Sarto.

Day division, Winter term: Lectures three hours a week.

C. Brown

Art History 11.335★

Northern Renaissance Art

This course examines the development of Flemish and German Renaissance art.

Day division, Fall term: Lectures three hours a week.

C. Brown

Art History 11.350★

British Art and Architecture: 1600-1850

This course concerns British art and architecture from the early seventeenth to the mid-nineteenth century.

Evening division, Fall term: Lectures three hours a week.

D. Goodreau

Art History 11.355★

Late Nineteenth-Century Art in France

This course treats the major artists of the Impressionist and Post-Impressionist movements in France.

Evening division, Winter term: Lectures three hours a week.

R. Mesley

Art History 11.360★

Art Since 1945

This course treats major artists and artistic movements from 1945 to the present. Emphasis is placed on the United States.

Prerequisite: Art History 11.260★ or permission of the Department.

Evening division, Winter term: Lectures three hours a week.

N. Luckyj

Art History 11.368★

Modern Architecture: The Nineteenth Century

This course covers selected topics in nineteenth-century architecture and urban planning in Europe and North America from the French Revolution to American commercial architecture.

Precludes additional credit for Architecture 76.308★

Day division, Fall term: Lectures three hours a week.

K. Crossman

Art History 11.369★

Modern Architecture: The Twentieth Century

This course considers the Bauhaus and the New Brutalism, and also includes such architects as Gaudi, Wright, Le Corbusier, Mies van der Rohe and Buckminster Fuller.

Precludes additional credit for Architecture 76.309★

Day division, Winter term: Lectures three hours a week.

K. Crossman

Art History 11.375★

Seminar on a Selected Museum Exhibition

This seminar focuses on a major exhibition held at a local museum. Students enrolled in this course are expected to bear all travel and other costs arising from required visits to the museum.

Prerequisite: Permission of the Department.

Not offered 1990-91.

Art History 11.376★

Seminar on a Selected Museum Exhibition

This seminar focuses on a major exhibition held at a local museum. Students enrolled in this course are expected to bear all travel and other costs arising from required visits to the museum.

Prerequisite: Permission of the Department.

Day division, Winter term: Lectures three hours a week.

Art History 11.390★, 11.391★, 11.392★

Practicum in Art History

An art history option enabling students to gain practical experience in the discipline by working on specific projects under the supervision of the staff of one of the museums or related settings in the Ottawa area. Readings, discussions and reports are integrated with the program in the different settings. Available institutions and positions within them on particular projects may change from year to year. A maximum of one credit of practicum may be offered in fulfillment of Art History requirements.

Prerequisite: Pass or Honours Art History registration with Third- or Fourth-year standing and a B+ or better average in Art History courses, or permission of the Department. Art History 11.390★ is normally a prerequisite for 11.391★ and 11.392★.

N. Luckyj, D. le Berrurier

Art History 11.400★

Topics in Canadian Art

This seminar examines in detail the contribution of selected individuals or movements in Canadian art in the context of Canadian society and the history of modern art.

Prerequisite: Art History 11.202★ or 11.300★ or 11.301★ or permission of the Department.

Not offered 1990-91.

Art History 11.403★

Topics in Canadian Native Art

This course deals with selected problems in Canadian Inuit or Indian art. The topic for Art History 11.403A★ for 1990-91 is *Contemporary Indian Art*. For Art History 11.403B★, the topic will be an aspect of Inuit art.

Prerequisite: Art History 11.203★ or permission of the Department.

11.403A★: Day division, Winter term: Seminar three hours a week

R. Phillips

11.403B★: Evening division, Winter term: Seminar three hours a week.

Art History 11.406★

Topics in American Art

This seminar examines selected aspects of American art and architecture.

Prerequisite: Permission of the Department.

Not offered 1990-91.

Art History 11.422★

Topics in Eastern Medieval Art

This seminar studies aspects of Eastern Medieval art and their influences in Western Europe.

Prerequisite: Art History 11.221★ or permission of the Department.

Not offered 1990-91.

Art History 11.423★

Topics in Western Medieval Art

This seminar focuses on aspects of Western Medieval art and their relationship to the Eastern Mediterranean area. The topic for 1990-91 is *Carolingian Art and its Influence on Ottonian and Anglo-Saxon Art*.

Prerequisite: Art History 11.220★ or permission of the Department.

Evening division, Fall term: Seminar two hours a week.

D. le Berrurier

Art History 11.431★

Topics in Iconography

In this course, attention is focused on selected problems in the meaning of visual images and available textual sources. In 1990-91, the course deals with religious iconography: biblical themes in Western art.

Day division, Fall term: Lectures three hours a week.

C. Brown

Art History 11.435★

Topics in Renaissance Art

This seminar deals with selected aspects of Renaissance art and their influence. In 1990-91, the topic is *Pagan Iconography in the Art of the Renaissance*.

Day division, Winter term: Lectures three hours a week.

C. Brown

Art History 11.450

Topics in British Romantic Art

This seminar examines selected aspects of British art and architecture of the eighteenth and early nineteenth centuries. The focus of the course in 1990-91 is the rise and development of the British school of landscape painting in the eighteenth and nineteenth centuries. A study of media and techniques is included, with emphasis on watercolour.

Prerequisite: Art History 11.350★ or permission of the Department.

Evening division, Winter term: Seminar two hours a week.

D. Goodreau

Art History 11.452★

Topics in Spanish Art

This seminar examines selected aspects of Spanish art. In 1990-91 this course examines the style and imagery of Goya's paintings and graphics, as well as the range of attitudes and opinions that critics, artists and art historians have held about Goya's work.

Prerequisite: Honours standing in Art History or permission of the Department.

Day division, Fall term: Seminar two hours a week.

D. Goodreau

Art History 11.455★

Topics in Nineteenth-Century European Art

This course examines selected aspects of nineteenth-century European art. In 1990-91, the topic is *Gauguin and His Circle in France*.

Prerequisite: Art History 11.250★ or 11.355★ or permission of the Department.

Summer, 1990, Evening division, First term. Seminar six hours a week.

R. Mesley

Art History 11.461★

Topics in Twentieth-Century Art

This seminar examines selected aspects of twentieth-century art. The topic for 1990-91 is *Contemporary Earthworks and Environmental Art*.

Prerequisite: Art History 11.260★ or permission of the Department.

Evening division, Fall term: Seminar three hours a week.

R. Mesley

Art History 11.475★

Seminar on a Selected Museum Exhibition

This seminar focuses on a major exhibition held at a local museum. Students enrolled in this course are expected to bear all travel and other costs arising from required visits to the museum.

Prerequisite: Fourth-year Honours standing and permis-

sion of the Department.

Not offered 1990-91.

Art History 11.476★

Seminar on a Selected Museum Exhibition

This seminar focuses on a major exhibition held at a local museum. Students enrolled in this course are expected to bear all travel and other costs arising from required visits to the museum.

Prerequisite: Fourth-year Honours standing and permission of the Department.

Day division, Winter term: Seminar three hours a week.

Art History 11.480★

Topics in Architectural History

This course examines selected aspects of architectural history from ancient times to the present. The topic for 1990-91 is *Ottawa Architecture*.

Day division, Fall term. Seminar three hours a week.

K. Crossman

Art History 11.487★

Topics in Art Criticism

This course introduces major problems and theories in art criticism with particular attention to whether the theories can be accepted. Theories considered include formalism, the expression theory, semiotics and cognitive theories. Problems include representation, how to decide what is a work of art, aesthetic and non-aesthetic criteria for evaluation.

Prerequisite: Permission of the Department.

Not offered 1990-91.

Art History 11.489★

Topics in Art History

This course examines selected aspects of art history from ancient times to the present. The topic for 11.489★A in 1990-91 is *Art Historical Finds through Underwater Archaeology*. The topic for 11.489★B in 1990-91 is *The Interaction of Photography and Art in the Twentieth Century*.

11.489★A: Day division, Winter term. Seminar two hours a week.

D. le Berrurier

11.489★B: Evening division, Winter term. Seminar three hours a week.

M. Rombout

Art History 11.490★, 11.491★, 11.492★

Directed Readings and Research

These courses consist of supervised readings and research projects in a specific area of art history to be chosen in consultation with the Honours Supervisor. Participation in these courses may require attendance in a course offered at a lower level. Guidelines must be obtained from the Honours supervisor prior to registration.

Prerequisite: Fourth-year Honours standing and permission of the Department.

Day and Evening divisions

Art History 11.499

Honours Research Essay

This course, designed for independent research under the supervision of a member of the Department, is open to those students with B+ standing in their Art History courses. An essay of approximately 10,000 words is the usual assignment. A written project outline, approved by the supervisor, must be submitted to the Honours Supervisor by the last day for course changes.

Prerequisite: Fourth-year Honours standing and permission of the Department.

Day and Evening divisions.

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Associate Chairman (Undergraduate Studies)
J.A. Webb

General Information

In addition to offering Honours and Pass B.Sc. programs for students in experimental science, the Department of Biology (Faculty of Science) offers Honours and Pass B.A. degrees either in Biology alone or combined with other programs in the Faculties of Arts and Social Sciences. The B.A. in Biology places less emphasis on support from the physical sciences, but allows students to relate their special knowledge of biology to other disciplines in the social sciences or humanities in a three-year program. The four-year Honours program allows the development of particular interests in depth and initiates the student into research in the field, laboratory or library. Generally, the Honours degree is a prerequisite for admission to graduate programs and is an advantage for those planning a professional career in teaching or administration in biology, including the health sciences, agriculture and environmental science.

The Combined Honours and Pass programs allow the simultaneous specialization in Biology and one of the humanities or social sciences. Because of the social and cultural impact of science and technology, interdisciplinary combinations such as Biology and Economics, Geography, History, Journalism, Law, Mathematics, Philosophy, Political Science, Psychology, Religion or Sociology-Anthropology should better qualify one to grapple with futurology and demography, biogeography and the environment, legal implications of pollution or biomedical engineering, science policy, comparative psychology, social evolution, or the historical, philosophical and spiritual implications of the biological revolution.

It is desirable to enter an Honours program as soon after First year as possible, to ensure that the sequence of selected courses will conform to degree requirements (pp. 65-66). Students pursuing the programs must arrange their courses in consultation with the Chairman or Associate Chairman of the department or departments according to one of the patterns outlined below.

Students who wish to major in Biology and who have the Ontario Academic Course (OAC) or Grade 13 in Biology should register, in their First year, in Biology 61.209★ and 61.230★. Students who wish to major in Biology but do not have the Ontario Academic Course or Grade 13 in Biology should register, in their First year, in Biology 61.102 and should also take Biology 61.230★ in the Winter term of their First year of study. See pp. 354-355 and Charts I and II (p. 356) for further details and complete information on programs and courses offered by the Department of Biology.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66, in addition to all departmental regulations and requirements as set out below.

Bachelor of Arts Biology Programs

Pass Program

Fifteen credits to include:

1. Six† Biology credits: Biology 61.201★, 61.202★, 61.209★, 61.214★, 61.220★, 61.230★, 61.360★, one of 61.391★, 61.392★ or 61.393★, two option credits. (†Seven Biology credits are required if Biology 61.102 is offered in lieu of the Ontario Academic Course in Biology);
2. Chemistry 65.100;
3. One additional Science credit not in Biology (unless Biology 61.102 is offered in lieu of the Ontario Academic Course in Biology);
4. At least three credits from any one department in either the Faculties of Arts or Social Sciences and one additional credit from any department in either of the Faculties of Arts or Social Sciences;
5. Three free-option credits, one of which must be at the 200 level or above.

Combined Pass Program

Fifteen credits to include:

1. Five† Biology credits: Biology 61.201★, 61.202★, 61.209★, 61.214★, 61.220★, 61.230★, 61.360★, one of 61.391★, 61.392★ or 61.393★, one option credit. (†Six Biology credits if Biology 61.102 is offered in lieu of the Ontario Academic Course in Biology);
2. Chemistry 65.100;
3. One additional Science credit not in Biology (unless Biology 61.102 is offered in lieu of the Ontario Academic Course in Biology);
4. The requirement for a Combined Pass program in either of the Faculties of Arts or Social Sciences;
5. Three or four free-option credits.

Honours Program

Twenty credits to include:

1. Seven† Biology credits to include Biology 61.201★, 61.202★, 61.209★, 61.214★, 61.220★, 61.230★, 61.325★, 61.335★, 61.360★, one of 61.391★, 61.392★ or 61.393★, one 400-level credit, 61.497 or 61.498. (†Eight Biology credits if Biology 61.102 is taken in lieu of the Ontario Academic Course in Biology; see 6 below);
2. Chemistry 65.100;
3. Two additional Science credits not in Biology, including one above the 100 level;
4. Six credits offered by either Faculties of Arts or Social Sciences to include at least three offered by one department and at least two at the 200 level or above;
5. Two 300- or 400-level credits approved by a Biology faculty member working in the student's area of specialization;
6. Two free-option credits. (One free option if Biology 61.102 is taken in lieu of the Ontario Academic Course in Biology).

†See *Notes on Programs*, p. 357.

Combined Honours Program

Twenty credits to include:

1. Six† Biology credits: Biology 61.201★, 61.202★, 61.209★, 61.214★, 61.220★, 61.230★, 61.360★, one of 61.391★, 61.392★ or 61.393★, two option credits (at least one at the 400 level). (†Seven Biology credits if Biology 61.102 is offered in lieu of the Ontario Academic Course in Biology);
2. Chemistry 65.100;
3. Two additional Science credits not in Biology, including one above the 100 level;
4. Seven to nine credits selected from those offered by the Faculties of Arts or Social Sciences, to include the requirement for a Combined Honours in another department, usually at least six credits;
5. An Honours project (Biology 61.497, 61.498, or equivalent from the student's other Honours department);
6. One to three free-option credits (depending upon the requirements for 1 and 4, above).

† See *Notes on Programs*, p. 357.

Dunton Tower, Room 1209
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M. Reynolds
R. Riordan
M. Smith
W. Thomas

Officers of the School

Director (Acting)

L. Heslop

School Administrator

M. Wissell

Supervisor of Honours Program

J.B. Waugh

Professors

D. Gerwin

G. Haines

Associate Professors

A.J. Bailetti

J.R. Callahan

D. Cray

L. Heslop

V.M. Jog

G.E. Kersten

M.N. Kiggundu

F. Kirk

U. Kumar

V. Kumar

W.M. Lawson

G.R. Mallory

J. Marshall

W. Michalowski

N.G. Papadopoulos

A.L. Riding

R. Thomas

J.B. Waugh

W.L. Weber

Assistant Professors

L. Duxbury

C. Hobbs

I. Lee

S. Pal

Lecturer

L. Dyke

Instructors

A. Clarke-Okah

A. Gibbons

D. Herauf

J. Maurice

Sessional Lecturers

R. Armit

O. Blouin

G. Bond

T. Casey

G. Dupont

J. Jackson

M. Kelly

W.D. Keys

P. Ledas

S. Marinoff

D. Mason

K. McKnight

M. Polowin

Bachelor of Commerce with Honours

The Bachelor of Commerce degree is an Honours program and candidates are required to complete a four-year program of studies after Senior Matriculation.

The Business program is designed to provide a broad foundation in the business academic disciplines. The required courses introduce the student to the relevant academic disciplines and to the functional areas of management. All students, in consultation with the faculty of the School, may structure the balance of their program to build upon this foundation in accordance with their personal career objectives and areas of interest. Suggested options for selected areas of interest are listed below. (See *Selected Fields of Interest*)

The program is offered mainly in the Day division; however, many course offerings are also available in the Evening division. Each student must spend a minimum of one year as a full-time student in the Day division.

Students who may wish to proceed to a Master's Degree in Public Administration at Carleton University should refer to the sections entitled *M.A. in Public Administration* given below. Students interested in pursuing graduate studies in business should refer to the section entitled *Master of Management Studies and Masters in Business Administration*.

Graduation Requirements

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all School regulations and requirements as set out below.

Admission Requirements

First Year

Completion of Qualifying University year with a grade-point average of 7.0 or better including Mathematics 69.006★ or 69.017★, and 69.007★; or

The Ontario Secondary School Diploma or the equivalent with a minimum average of 65 percent and including six Ontario Academic Courses (OACs), two of which must be Calculus and Algebra/Geometry. Although it is not an admission requirement, an OAC in English is recommended.

It should be noted that the number of student spaces in the School is limited. Thus, it may not be possible to grant admission to all applicants who meet the foregoing requirements. Admissions will, therefore, be on a selective basis with preference given to those candidates who show the highest promise of success in the program. Students who fail to meet the standards required for entry to the Honours program may elect to take their First year in the three-year Bachelor of Arts program. The First-year program should include Business 42.101★, 42.102★, Economics 43.100 and Mathematics 69.109★ and 69.119★. Application may then be made for admission to the Second year of the

Business program. The requirements for admission to Honours will apply.

Second and Subsequent Years

Applications for admission to the Second or subsequent years will be assessed on their merits. Minimum transfer requirements are stated on pp. 60-61. Advanced standing will be granted only for those courses that are assessed as appropriate for the Business program.

Course Requirements

Candidates for the Bachelor of Commerce degree take a total of 25 courses after Junior Matriculation or 20 after Senior Matriculation.

Students with a prior university degree will receive advanced standing where appropriate. Acceptance in the program will be governed by the standards required for entry to the Honours program; however a minimum of seven additional courses will be required, following admission to the program, for the Bachelor of Commerce degree.

Students who propose to include language courses in their program must obtain prior approval from the School.

Academic Standing

To continue in Commerce, students proceeding into the Second or Third year must maintain a grade-point average (GPA) of at least 6.0 in the Honours subjects (in Commerce, Honours means core or required courses) and a Continuation Index (CI) of 6.00. To proceed into and continue in Fourth year, students in Commerce must have and maintain a GPA of at least 6.5 in Honours subjects and a CI of 6.00. Entry to Fourth-level Business courses will be governed by academic performance in prerequisite courses. The minimum acceptable grade for entry into such courses is a grade of C—in the designated prerequisites.

The GPA for continuation is calculated on the basis of all courses attempted during the academic year. Where the record includes supplemental and grade-raising examinations and/or repeated courses, only the last attempt is included in this GPA. In Commerce, forfeited courses are included in the calculation.

The attention of students is drawn to the regulations relating to Honours on pp. 63-64 of the Calendar.

Course Load

The normal course load for a full-time undergraduate student during the Winter session is five credits. In the Business program slightly more than half of these credits are obligatory. Subject to program approval, the remaining courses may be selected in the light of individual preference.

Course Selection

Required (Core) Courses

Under the course credit system there is no promotion from one year to the next after First year. The required course

listings for Second year and subsequent years, then, reflect a recommended course pattern; individual students may wish to adapt the timing of individual courses to meet their own particular needs or preferences.

First Year

Business 42.100, Introduction to Accounting
Business 42.140★, Introduction to Computers for Business Students (However, for those students who plan to take 300- or 400-level courses in the Information Systems field of interest, either Computer Science 95.105★ or Engineering 91.166★ should be taken in place of or in addition to Business 42.140★.)

Economics 43.100 Introduction to Economics
Mathematics 69.109★, Calculus: With Applications to Business and Economics, or Mathematics 69.107★ Elementary Calculus I

Mathematics 69.119★ Algebra: With Applications to Business and Economics, or Mathematics 69.117★ Elementary Algebra

Psychology 49.100, Introduction to Psychology, or Sociology 53.100 Introduction to Sociology

All First-year Bachelor of Commerce students are required to take Business 42.180★. However, students may be exempted from Business 42.180★ by means of a placement test offered during the first week of the Fall term. If exempted from Business 42.180★, students should substitute a half course that has no prerequisites, such as Business 42.210★ or Business 42.261★ or Computer Science 95.105★ or Engineering 91.166★ or a course offered by another academic unit (e.g., Art History, Geography, Philosophy).

Second Year

Business 42.210★, Management and Organizational Behaviour

Business 42.228★, An Introduction to Marketing

Business 42.230★, Introduction to Management Science

Business 42.240★, An Introduction to Business Information Systems

Business 42.250★, An Introduction to Business Finance

Business 42.261★, Business Law I

Economics 43.202★, Intermediate Microeconomics I

Economics 43.212★, Intermediate Macroeconomics I

Economics 43.220, Statistical Methods in the Social Sciences or

Mathematics 69.266★, Business Statistics I and 69.267★ Business Statistics II

Third Year

Business 42.311★, Micro Organizational Behaviour

Business 42.317★, Introduction to Industrial Relations

Business 42.337★, Operations Management

Fourth Year

Business 42.469★, Business Policy Seminar and an additional two and one-half 400-level credits of which at least one and a half credits must be selected from courses offered by the School of Business.

Selected Fields of Interest

The following sets out a listing of suggested options by area of interest. The courses listed are *intended to provide a*

general guideline only; consultation with members of the School of Business is recommended.

Students are urged to plan in advance in order to accommodate course prerequisites and fulfil all graduation requirements.

The School of Business offers various sections of Business 42.460★–42.467★, Topics in Management Studies. The course content for each section may vary from year to year. Course contents are publicized only before registration. The suggestions offered below do not include the Business 42.460★–42.467★ offerings; however, students may elect to take these courses as partial fulfilment of their 400-level Business requirement. Further information on Topics in Management Studies may be obtained from the School of Business.

• Accounting

This area of study is designed for students interested in career opportunities in professional accounting: financial accounting and auditing, or management accounting in the private or public sectors.

Students who intend to proceed to a professional accounting qualification as a Chartered Accountant (C.A.), Certified General Accountant (C.G.A.), or Certified Management Accountant (C.M.A.), should consult one of the faculty members in accounting.

Second Year

Core Courses

Business 42.210★, 42.230★, 42.240★, 42.250★.
Economics 43.202★, 43.212★;
Economics 43.220 or Mathematics 69.266★ and 69.267★.

Option

Business 42.200.

Third Year

Core Courses

Business 42.228★, 42.261★, 42.311★, 42.317★, 42.337★.

Options

Business 42.301★ and 42.262★, 42.350★.

Students may select their remaining half credit from a variety of courses offered by the School of Business and other academic units. Courses that may be of interest to students who select the accounting option include Business 42.342★ and 42.440★.

Fourth Year

Core Course

Business 42.469★.

Options

Business 42.305★, 42.308★, 42.400★, 42.402★, 42.405★, 42.407★.

A minimum of one credit from:

Business 42.309★, 42.401★, 42.440★, 42.442★.

Students may select their remaining credits from a wide variety of courses offered by the School of Business and other academic units.

• Finance

This area of study is designed for students interested in

career opportunities in corporate finance, investment management and the management of financial institutions.

Students are advised to follow the core course requirements for First and Second years.

Third Year

Core Courses

Business 42.311★, 42.317★, 42.337★.

Options

Business 42.350★ and 42.352★.

Two and a half credits from:

Business 42.200, 42.342★, 42.348★;

Economics 43.203★, 43.213★;

Mathematics 69.353★ and 69.354★;

Philosophy 32.203★.

Fourth Year

Core Course

Business 42.469★.

Options

Business 42.450★ and 42.452★.

A minimum of one and a half credits from:

Business 42.435★, 42.440★, 42.442★, 42.446★, 42.453★;

Economics 43.420★.

Students may select their remaining credits from a wide variety of courses offered by the School of Business and other academic units. Courses that may be of interest to students who select the finance option include:

Business 42.305★, 42.308★, 42.327★, 42.360★, 42.361★, 42.405★;

Economics 43.362★, 43.485;

Law 51.321, 51.341★, 51.342★.

• General

This area of study is designed for students interested in career opportunities that integrate various business disciplines and for owner/managers of small and medium size business.

Students are advised to follow the core course requirements for First and Second years.

Third Year

Core Courses

Business 42.311★, 42.317★, 42.337★.

Options

Business 42.308★, 42.312★, 42.325★, 42.360★, 42.361★.

Students may select their remaining credit from a wide variety of courses offered by academic units other than the School of Business.

Fourth Year

Core Course

Business 42.469★.

Options

Business 42.352★, 42.413★, 42.428★, 42.440★.

Students may select their remaining two and a half credits from a wide variety of courses offered by the School of Business and other academic units.

• **Human Resources Management**

This area of study is designed for students interested in personnel management, human resources management and management of public and private sector organizations.

Second Year

Core Courses

Business 42.210★, 42.240★, 42.250★, 42.261★;
Economics 43.202★, 43.212★;
Economics 43.220 or Mathematics 69.266★ and 69.267★.

Third Year

Core Courses

Business 42.228★, 42.230★, 42.311★, 42.317★, 42.337★.

Options

Business 42.262★, 42.312★;
Two credits from:
Business 42.361★;
Psychology 49.260★, 49.345★, 49.372★;
Sociology 53.346★, 53.355, 53.370.

Fourth Year

Core Course

Business 42.469★.

Options

Business 42.413★, 42.414★, 42.415★;
One credit from:
Economics 43.465;
Law 51.345★, 51.440★.

Students may select their remaining credits from a wide variety of courses offered by the School of Business and other academic units. Courses that may be of interest to students who select the human resources management option include:

Business 42.360★, 42.440★;
Economics 43.356★;
Psychology 49.311★.

• **Information Systems**

This area of study is designed for students interested in career opportunities in data processing, systems analysis, decision support systems, computer auditing and management information systems.

Second Year

Core Courses

Business 42.228★, 42.230★, 42.240★, 42.250★;
Economics 43.202★, 43.212★;
Economics 43.220 or Mathematics 69.266★ and 69.267★.

Options

Computer Science 95.106★, 95.202★.

Third Year

Core Courses

Business 42.210★, 42.261★, 42.311★, 42.317★, 42.337★.

Options

Business 42.342★, 42.348★;
Computer Science 95.204★;
Engineering 94.304★.

Students may select their remaining half credit from a wide variety of courses offered by the School of Business and other academic units.

Fourth Year

Core Course

Business 42.469★.

Options

Business 42.440★, 42.442★, 42.446★;
Computer Science 95.403★.

Students may select their remaining two and a half credits from a wide variety of courses offered by the School of Business and other academic units.

• **International Business**

This area of study is designed for students interested in career opportunities with multinational corporations or with public sector organizations with business interests abroad.

Second Year

Core Courses

Business 42.210★, 42.240★, 42.261★;
Economics 43.202★ and 43.212★;
Economics 43.220 or Mathematics 69.266★ and 69.267★.

Options

Political Science 47.260;
Business 42.262★.

Third Year

Core Courses

Business 42.228★, 42.230★, 42.250★, 42.311★, 42.317★, 42.337★.

Options

Law 51.327★, 51.328★;
Political Science 47.360★, 47.361★.

Fourth Year

Core Course

Business 42.469★.

Options

Business 42.413★, 42.425★, 42.440★;
Law 51.420★;
Economics 43.361★, 43.362★.

Students may select their remaining credit from a variety of courses offered by the School of Business and other academic units.

• **Marketing**

This area of study is designed for students interested in an international, behavioural, economic, quantitative or research approach to marketing.

Second Year

Core Courses

Business 42.210★, 42.228★, 42.240★, 42.250★;
Economics 43.202★;
Economics 43.220 or Mathematics 69.266★ and 69.267★.

Options

One and a half credits from:
Industrial Design 85.100★ and 85.101★;
Mass Communications 27.111;
Philosophy 32.203★;

Political Science 47.100;
 Psychology 49.311★;
 Psychology 49.210★ or Sociology 53.210;
 Sociology-Anthropology 56.220.

Third Year

Core Courses

Business 42.230★, 42.261★, 42.311★;
 Economics 43.212★.

Options

Business 42.325★, 42.327★.

Two credits from:

Business 42.262★, 42.312★, 42.342★, 42.348★,
 42.350★, 42.352★, 42.360★, 42.361★;
 Economics 43.320★, 43.360★, 43.361★;
 Industrial Design 85.312★, 85.313★;
 Mathematics 69.350, 69.353★, 69.354★;
 Political Science 47.260;
 Psychology 49.260★, 49.270★;
 Sociology 53.251★, 53.254★.

Fourth Year

Core Courses

Business 42.317★, 42.337★, 42.469★.

Options

Business 42.425★, 42.426, 42.428★.

A minimum of a half credit from:

Business 42.413★, 42.435★, 42.440★, 42.442★,
 42.446★, 42.450★, 42.452★;
 Economics 43.451★;
 Mathematics 70.452★, 70.453★, 70.456★.

Students may select their remaining credits from a wide variety of offerings. Courses that may be of interest to students who select the marketing option include:

Law 51.325★, 51.327★, 51.328★, 51.341★, 51.342★;
 Political Science 47.360★;
 Psychology 49.372★;
 Sociology 53.345★, 53.348★, 53.351★.

• Operations Management

This area of study is recommended for students interested in production, operations research and management science. Courses in this option stress the use of quantitative methods in business.

Second Year

Core Courses

Business 42.228★, 42.230★, 42.240★, 42.250★;
 Economics 43.202★, 43.212★;
 Economics 43.220 or Mathematics 69.266★ and 69.267★.

Options

Mathematics 69.207★, 69.217★.

Third Year

Core Courses

Business 42.210★, 42.337★.

Options

Four credits from:

Business 42.308★, 42.327★, 42.342★, 42.348★,
 42.350★, 42.352★;
 Economics 43.203★;
 Mathematics 69.208★, 69.353★, 69.354★, 70.260.

Fourth Year

Core Courses

Business 42.261★, 42.311★, 42.317★, 42.469★.

Options

A minimum of two and a half credits from:

Business 42.435★, 42.440★, 42.442★, 42.446★,
 42.450★, 42.452★;
 Economics 43.485.

Students may select their remaining credits from a wide variety of courses offered by the School of Business and other academic units. Courses that may be of interest to students who select the operations management option include:

Engineering 94.405★;
 Mathematics 69.381★, 70.356★;
 Philosophy 32.203★.

Master of Management Studies

The School of Business offers a graduate program in the field of management leading to the Master of Management Studies (M.M.S.)

The focus of the program is applied research directed toward developing productivity and innovation in Canadian business. The program of studies will develop in students the conceptual and methodological skills required to undertake, manage and evaluate business research. It is designed to prepare students for managerial and policy roles in Canadian business. The applied research skills developed in the program are deemed to be essential if Canadian business is to be more productive and innovative in the increasingly competitive and complex world economy. The M.M.S. program requires successful completion of the equivalent of 10 half-credit courses. Students must complete seven half-credit courses of which at least five must be at the 500 level or above and a thesis equivalent to three half credits.

The areas of specialization within the program are:

Business Information Systems
 Finance
 Management
 Marketing

M.A. in Public Administration

Students completing a Bachelor of Commerce degree program with at least High Honours standing may complete the M.A. in Public Administration offered at Carleton University in one year. Students interested in pursuing the Masters degree should take as many of the following courses as possible for their free undergraduate options:

Political Science 47.200, Canadian Government and Politics;
 Law 51.456★, Administrative Law I;
 Political Science 47.340, Canadian Public Administration;
 Political Science 47.401, Canadian Public Policy.

Masters in Business Administration

Most Canadian universities offering an M.B.A. degree will

grant advanced standing to applicants with a Bachelor of Commerce (Honours) degree. Students interested in pursuing an M.B.A. should select their courses in consultation with the members of the School of Business.

Courses Offered

Some of the following courses are cross-listed from other sections of the Calendar. Business students should register in cross-listed courses under the Business number (prefix 42). In all courses with computer programming assignments, students will find it necessary to be on campus at other than the lecture periods to make use of computing facilities.

Business 42.100

An Introduction to Accounting

A course open only to students registered in the Business program, and to declared Major students in Economics. Accounting method; concepts of income determination and asset valuation; accounting information for managerial decisions.

Precludes additional credit for Business 42.101★ and 42.102★.

Day division: Lectures three hours a week.

Business 42.101★

Principles of Financial Accounting

Discussion of the concepts of asset valuation and income measurement underlying the preparations and interpretation of financial statements.

Precludes additional credit for Business 42.100.

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week.

Business 42.102★

Management Accounting

An introduction to the problems of the use of accounting data for the purposes of planning and control of operations.

Precludes additional credit for Business 42.100.

Prerequisite: Business 42.101★.

Day and Evening divisions, Winter term: Lectures three hours a week.

Business 42.140★

Introduction to Computers for Business Students

An introduction to the use of computers in problem solving and data processing. Information flows within business, fundamentals of structured interactive programming for business applications. Students are exposed to application software packages and introduced to management information systems. (Also listed as Computer Science 95.140★.)

Precludes additional credit for Computer Science 95.100★ and 95.104★ (no longer offered).

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week.

Business 42.180★

Elements of English Writing

The course is designed to improve English communication skills. Emphasis is placed on the development of one's ability to express ideas effectively by learning and practising the basic elements of the English language and composition. This course requirement will be waived for students who pass a placement test. Business students only.

Day division, Fall term: Lectures three hours a week.

Business 42.200

Intermediate Accounting

Further development of problems of revenue recognition and asset valuations.

Prerequisite: Business 42.100 (grade of C- or better) or Business 42.101★ and 42.102★ (grade of C- or better in both courses).

Day and Evening division: Lectures three hours a week.

Business 42.210★

Management and Organizational Behaviour

The central focus of the course is the structure and management of complex organizations in an international economy. The effects of technology, environment, culture and organizational goals on the macro characteristics of structure are examined. Power, control and decision-making are discussed as examples of processes that link organizations and the individuals who work in them.

Precludes additional credit for Business 42.214★ (no longer offered).

Day and Evening divisions, Fall and Winter terms: Lectures and discussion groups three hours a week.

Business 42.224★

Basic Marketing

A broad introduction to the basic problems and practices in marketing, for students without a background in accounting and business. Focus is on marketing strategy, planning, packaging, branding and promotion at the individual firm level.

This course does not carry credit for Business students. Only Industrial Design students may enrol.

Evening division, Winter term: Lectures three hours a week.

Business 42.228★

Introduction to Marketing

An overview of the marketing function within the firm is sought. Promotion, product design, pricing and distribution channels are examined as key elements of the marketing mix. Consumer buyer behaviour, trends in retailing, wholesaling, sales force management and marketing research are other topics to be reviewed. Case studies are used to supplement class and reading material.

Prerequisites: Business 42.100 (or 42.101★ and 42.102★), Economics 43.100 and one of Psychology 49.100 or Sociology 53.100 (a grade of C- or better in all three courses).

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week.

Business 42.230★

Introduction to Management Science

Introduction to management science techniques that are routinely used as decision aids in government and industry. The course examines linear programming techniques, decision analysis and simulation. Students are introduced to quantitative models for decision making.

Precludes additional credit for Economics 43.404★, Mathematics 69.381★ and Engineering 94.320★.

Prerequisites: Business 42.140★ or Computer Science 95.105★ and Mathematics 69.109★ and 69.119★ or equivalent (a grade of C- or better required in all of these courses).

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week.

Business 42.240★

Business Information Systems

The role of information systems in organizations. The course focuses on system development, including planning, feasibility, analysis, databases, design, implementation and evaluation. Students are required to work with

database management applications packages.

Precludes additional credit for Business 42.290★ or Computer Science 95.290★.

Prerequisites: Business 42.100 (or 42.101★ and 42.102★) and one of Business 42.140★ or Computer Science 95.105★ or Engineering 91.166★ or 94.165 (no longer offered), (a grade of C– or better in each prerequisite).

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week.

Business 42.250★

Introduction to Business Finance

A study of business firms' financing, capital investment and dividend policy decisions, cost of capital and short-term asset management problems. (Also listed as Economics 43.250★.)

Prerequisites: Economics 43.100, Business 42.100 (or 42.101★ and 42.102★) and Mathematics 69.109★ and 69.119★ or equivalent (a grade of C– or better in all of these courses).

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week.

Business 42.261★

Business Law I

An introduction to the legal system and legal ordering as it affects those engaged in business and economic activities. The law of tort is examined, including principles governing liability for negligence and intentional interference with others. The law of contract is studied, including the creation and enforceability of voluntary agreements and remedies for breach.

Precludes additional credit for Law 51.231★.

Prerequisite: For Business students only. Note: Students in Law programs cannot include Business 42.261★ towards the fulfilment of their degree requirements, even as an option.

Day or Evening division, Fall term: Lectures and discussion three hours a week.

Business 42.262★

Business Law II

A survey of legal topics of importance to those involved in business relationships. These topics include forms of business organization, property law and specialized contractual relationships such as sale of goods, negotiable instruments, personal property security, insurance, bailment and agency.

Precludes additional credit for Law 51.232★.

Prerequisite: Business 42.261★ or Law 51.231★. Note: Students in Law programs cannot include Business 42.262★ towards the fulfilment of their degree requirements, even as an option.

Day or Evening division, Winter term: Lectures and discussion three hours a week.

Business 42.301★

Accounting for Business Combinations

Consideration of accounting problems associated with business combinations. Particular attention is given to the preparation of consolidated financial statements. Discussion may also extend to financial reporting and diversified companies, reorganizations, etc. Selection of some topics may vary from year to year.

Prerequisite: Business 42.200.

Day and Evening divisions, Fall and Winter terms: Lectures and seminars three hours a week.

Business 42.305★

Taxation 1: Introduction to Federal Income Tax

An examination of federal income tax laws and regulations

and their impact on an individual's financial and business decisions. Problems, issues and planning associated with the Income Tax Act and concerned with the computation of taxable income and taxes payable by an individual are discussed.

Prerequisite: Business 42.200 with a minimum grade of C–.

Evening division: Fall term.

Business 42.308★

Cost Accounting

The use of accounting information for purposes of cost control and performance evaluation. Topics include: analysis and control of elements of cost; design and use of job order, process cost and standard cost systems; analysis of cost variances; variable costing; cost estimation; cost evaluation.

Prerequisites: One of Business 42.100 or 42.102★ and Economics 43.220 or Mathematics 69.267★ (a grade of C– or better in both courses).

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week.

Business 42.309★

Cost Management Systems

Discussion of the role of accounting in cost control, performance evaluation and product costing. Attention is directed to the significant changes in the manufacturing environment and the reporting problems arising therefrom.

Prerequisite: Business 42.308★.

Business 42.311★

Micro-Organizational Behaviour

The course examines cognitive-behavioural models of performance, alternative theories of motivation, organizations as social structures, socio-technical systems, organization change and conflict.

Prerequisite: Business 42.210★ and Psychology 49.100 or Sociology 53.100 (a grade of C– or better in each prerequisite).

Day division, Fall and Winter terms: Lectures three hours a week.

Business 42.312★

Personnel Management

An examination of the personnel management function in large formal organizations, with emphasis on the private sector. Topics include manpower planning, recruitment, selection, performance evaluation, career development and training, compensation and benefits and the role of the professional personnel manager.

Prerequisite: Business 42.311★.

Day and Evening division, Fall and Winter terms: Lectures three hours a week.

Business 42.317★

Introduction to Industrial Relations

An introduction to industrial relations covering such topics as: industrial relations systems, the functioning of trade unions, collective bargaining in Canada and Canadian public policy in industrial relations. (Also listed as Economics 43.357★.)

Prerequisite: Economics 43.100.

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week.

Business 42.325★

Marketing Communications

Study of promotion as a communication process and a tool of marketing management. The course examines the planning of a promotional campaign, including budget develop-

ment, consumer research in promotion, creative strategy, media strategy, non-product promotion, ethical issues and evaluating the effectiveness of promotional programs.
Prerequisite: Business 42.228★.

Day division, Winter term: Lectures three hours a week.

Business 42.327★

Marketing Research

This first course in marketing research covers such topics as: research design, questionnaire design, scales, sources of information and error, sampling techniques, basic statistical measures, measures of association, regression, and an overview of multivariate methods. The pragmatic implications of marketing research are stressed, with the use of case studies and actual data analysis.

Prerequisites: Business 42.228★ and one of Economics 43.220 or Mathematics 69.266★ and 69.267★.

Day division, Fall term: Lectures three hours a week.

Business 42.337★

Operations Management

Examines the performance of the managerial activities entailed in selecting, designing, operating and controlling and updating production systems.

Prerequisites: Business 42.230★ and one of Economics 43.220 or Mathematics 69.266★ and 69.267★ (grade of C- or better in all courses).

Day division, Fall and Winter terms: Lectures three hours a week.

Business 42.342★

Business Systems I

Introduction to the methods of specification, analysis, design and implementation of computer-based information systems. Topics covered in the course include: structured analysis and design; requirements analysis; technology assessment; the systems development life cycle; project management; data analysis and design; input/output design; organizational impact; testing and integration; staffing; management.

Precludes additional credit for Engineering 94.310★.

Prerequisites: Business 42.240★ and one of Computer Science 95.105★ or Engineering 91.166★ or 94.165 (no longer offered).

Day division, Fall term: Lectures three hours a week.

Business 42.348★

Quantitative Applications of Computers in Business

This course uses the computer as a problem-solving tool in government and business. The interactive language APL is used to formulate and implement solutions to problems in finance, marketing and operations management.

Precludes additional credit for Business 42.291★ and Computer Science 95.291★.

Prerequisites: Business 42.250★, 42.230★ or equivalent and Mathematics 69.266★ or equivalent and one of Computer Science 95.105★ or Engineering 91.166★ or 94.165 (no longer offered), (a grade of C- or better in each prerequisite).

Evening division, Fall term: Lectures three hours a week.

Business 42.350★

Corporate Finance

An examination of the major issues in corporate finance and applied financial management. Topics include: introduction to portfolio theory, the capital asset pricing model, cost of capital, capital structure and dividend policy, lease financing, capital budgeting under uncertainty, mergers and consolidations. (Also listed as Economics 43.350★.)

Prerequisites: Business 42.250★, Economics 43.202★ and one of Economics 43.220 or Mathematics 69.267★.

Day division, Fall and Winter terms: Lectures three hours a week.

Business 42.352★

Principles of Investments

Procedures and methods of investment analysis. The stock and bond markets. Government regulation of securities markets. Valuation of common stocks and fixed income securities. Options, warrants, convertibles and commodities. (Also listed as Economics 43.351★.)

Prerequisites: Business 42.250★ and Economics 43.220 or Mathematics 69.267★.

Day division, Fall and Winter terms: Lectures three hours a week.

Business 42.360★

Small Business Management

This course deals with the socio-economic functions and activities of the owner-manager entrepreneur and examines the operations and nature of small businesses. Methods and models that are useful in the analysis of a small business enterprise are employed.

Prerequisites: Business 42.228★ and 42.250★.

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week.

Business 42.361★

Business and Its Environment

This course provides an integrative macro-perspective of dynamic conditions that influence Canadian business, its organization, management and operations. Environmental forces studied include consumerism and other social groups, technological developments, economic conditions, politico-governmental actions and legislation as well as such contemporary issues as ecology and pollution, "the Conservator Society" and national policies and strategies for food, energy and housing. Business in its environment is studied as a system.

Prerequisites: Economics 43.100 and one of Sociology 53.100 or Psychology 49.100.

Evening division, Fall term: Lectures three hours a week.

Business 42.400★

Accounting Theory

A study of the evolution of accounting theory with emphasis on concepts of income and current issues.

Prerequisite: Business 42.200, (a grade of C- or better).

Day division, Fall term: Lectures three hours a week.

Business 42.401★

Research Topics in Accounting

An examination of approaches to research in accounting and an evaluation of selected topics of current interest in accounting theory and accounting research.

Prerequisite: Business 42.400★ (a grade of C- or better).

Day division, Winter term: Lectures three hours a week.

Business 42.402★

Advanced Accounting Problems

Discussion, analysis, and integration of accounting, auditing, and income tax issues and problems encountered in professional practice. This course builds upon and integrates the knowledge and skills developed in preceding courses.

Precludes additional credit for Business 42.302★, no longer offered.

Prerequisite: Business 42.200, (a grade of C- or better).

Day and Evening divisions, Winter term: Lectures three hours a week.

Business 42.405★**Taxation 2: Corporate Tax Management**

An intensive review of federal income tax laws and regulations as significant elements in the planning and decision making process of taxable Canadian corporations. Emphasis is placed upon the tax planning function of corporate management and the associated accounting and reporting aspects. This course builds upon Business 42.305★, Taxation 1.

Prerequisite: Business 42.305★, (a grade of C– or better). Evening division, Winter term.

Business 42.407★**Auditing**

A course in auditing theory, methodology and application.

Prerequisite: Business 42.200, (a grade of C– or better). Day and Evening divisions, Fall term: Lectures three hours a week.

Business 42.409★**Auditing in an EDP Environment**

This course is intended to familiarize the student with the basic components of an EDP environment, enabling the student to gain an awareness of the impact of computerization on the audit process, and to develop an understanding of computer controls and EDP audit skills.

Precludes additional credit for Business 42.461★ taken in 1985-86 or before.

Prerequisites: Business 42.240★ and 42.407★, (a grade of C– or better in each prerequisite).

Evening division, Winter term.

Business 42.413★**Applied Organization Theory**

The focus is on the organization as a unit of analysis. Organizations, particularly business organizations, are analyzed from the point of view of modern administration theory. The course emphasizes management applications of various theories or organization (for example, decision, control, contingency, institutional, and modern variants of human relations theory). Analysis may utilize the traditional business case approach and/or field projects. Students learn to apply the theories in the context of the management process.

Prerequisites: Business 42.311★, (a grade of C– or better). Day division, Fall term: Lectures three hours a week.

Business 42.414★**Advanced Personnel Management**

This course examines a number of personnel and human resources management topics in depth. Attention is focused on the design and analysis of personnel systems, the development and critical evaluation of human resource strategies in work organizations and the study of related current issues in the practice and literature of personnel management.

Prerequisite: Business 42.312★, (a grade of C– or better). Day division: Lectures three hours a week.

Business 42.415★**Organization Development and Change**

This course examines process and structural theories of organizational development and change. Issues of organizational effectiveness, problem solving and personnel development and renewal are considered along with strategies for and processes of bringing about change. Students are exposed to various theories and methods of individual and organizational diagnosis and intervention.

Prerequisite: Business 42.311★, (a grade of C– or better). Day division: Lectures three hours a week.

Business 42.425★**International Marketing**

A study of the marketing function in international markets from a managerial perspective. The course examines the unique political, legal, economic, socio-cultural and technological environments in foreign markets in relation to the marketing management functions of product, price, distribution, and communication strategy as well as marketing research.

Prerequisite: Business 42.228★, (a grade of C– or better).

Business 42.426**Consumer Behaviour**

The traditional socio-psychological theories of consumer behaviour are examined. Stress is put on the current literature and on the fundamental theories and concepts from various disciplines. Topics include motivation, personality, perception, learning, communication of innovations, attitude theory, role theory, life style analysis, consumerism, etc.

Prerequisite: Business 42.228★, (a grade of C– or better). Day division: Lectures three hours a week.

Business 42.428★**Marketing Management**

This course emphasizes the "managerial" aspects of marketing. Such topics as: market segmentation, social and regulatory aspects in marketing, channels of distribution, industrial marketing, sales force management and other current topics are discussed in detail.

Prerequisite: One of Business 42.325★ or 42.327★, (a grade of C– or better in each prerequisite). Day division, Winter term: Lectures three hours a week.

Business 42.435★**Operations Research II**

Dynamic programming inventory models, queuing, simulation, non-linear programming. (Also listed as Economics 43.405★.)

Prerequisites: Business 42.230★ or Economics 43.404★, or Mathematics 69.381★, and Economics 43.220 (grade of C– or better) or Mathematics 69.267★ (grade of C– or better).

Day division, Winter term: Lectures three hours a week.

Business 42.439**Statistical Decision Theory**

An examination of Bayesian and classical approaches to decision making under uncertainty for individuals and firms. (Offered in the Department of Economics as Economics 43.406★ and 43.407★. Students are advised that it is preferable to take Economics 43.406★ prior to 43.407★.)

Prerequisites: Economics 43.220 and Mathematics 69.267★ and Economics 43.202★ with a minimum grade of C– in all prerequisites.

Business 42.440★**Management of Information Systems**

Comprehensive treatment of current trends and management issues associated with information systems within organizations. Problems of information systems planning, administration, resource management and new technology adoption are discussed. Topics may also include information centres, managing end-user computing, database administration, managing distributed systems, education and multinational issues. Case studies and software packages will be used.

Prerequisites: Business 42.240★ and one of Computer Science 95.105★ or Engineering 91.166★ or 94.165★ (no longer offered), (a grade of C– or better in each prereq-

uisite).
Day division, Fall term.

**Business 42.442★
Business Systems II**

This is a data-processing project course. Students are required to form teams for the purpose of designing and implementing a typical business information system. Projects are mostly drawn from actual problems suggested by local business and institutions.

Prerequisite: Business 42.342★, (a grade of C- or better).
Day division, Winter term: Lectures three hours a week.

**Business 42.446★
Tools for Decision Making**

The course describes the framework, processes and technology components for building decision support systems, including planning and organizing for DSS, system design and iterative design, integrating DSS into the organization. Forecasting and simulation are studied in depth. Topics may include modern technologies such as knowledgebase systems and artificial intelligence. High level modelling languages are used to provide first-hand experience in developing DSS for business applications.

Prerequisites: Business 42.230★ or equivalent and 42.240★ and one of Computer Science 95.105★ or Engineering 91.166★ or 94.165 (no longer offered), (a grade of C- or better in each prerequisite).

Day division: Lectures three hours a week.

**Business 42.450★
Advanced Corporate Finance**

An in-depth examination of some of the major theoretical issues in corporate finance. This course requires analyses and presentations of both articles from the finance literature and case studies. (Also listed as Economics 43.408★.)

Prerequisite: Business 42.350★, (a grade of C- or better).
Day division, Winter term: Lectures three hours a week.

**Business 42.452★
Investment Management**

Analysis of investment requirements for individuals and institutional investors. Liquidity, risk and return. Portfolio design, construction, management and control. Performance measurement. Capital market theory. (Also listed as Economics 43.411★.)

Prerequisite: Business 42.352★, (a grade of C- or better).
Day division, Winter term: Lectures three hours a week.

**Business 42.453★
Finance and Capital Markets**

The workings and structure of Canada's capital markets with particular reference to differing classes of institutional lenders and borrowers; relationships of non-bank financial intermediaries to the banking system, regulatory agencies and the public, the impact of these institutions on corporate financial and national economic policy, access to foreign capital markets and external financing of Canadian economic development. (Also listed as Economics 43.410★.)

Prerequisite: Economics 43.202★, 43.203★, 43.212★, 43.213★, 43.220★ or Mathematics 69.267★ (grade of C- or better in each prerequisite).

Day division, Fall and Winter terms: Lectures and seminars three hours a week.

• **Topics in Management Studies (42.460★—42.467★)**

During the 1990-91 academic year, the School of Business expects to offer the following special-topics courses:

**Business 42.460★
Topics in Management Studies**

Consideration of selected topics in accounting, finance, human resources, information systems, international business, marketing, operations management, etc.

Prerequisite: Permission of the School.

**Business 42.463★
International and Comparative Management**

This course focuses on the problems of managing large organizations whose operations span national boundaries, including both domestic firms with international markets and multinational corporations. Special attention is given to the difficulties of maintaining lines of communication and control between elements separated by long distances and located in disparate cultural settings. The structural, legal, staffing and operational implications of maintaining a successful international operation are also discussed. Throughout the course, comparisons are drawn between domestic and international systems of management in various countries including Canada, the United States, France, Great Britain and Japan.

Prerequisite: Business 42.311★, (a grade of C- or better).

**Business 42.465
Directed Studies I**

This course is intended to provide students with the opportunity of carrying out a major research project under the supervision of a faculty member.

Prerequisite: Permission of the School.

**Business 42.466★
Directed Studies II (Term Paper)**

This course provides students with the opportunity of carrying out a minor (one-term) research project under the supervision of a faculty member.

**Business 42.467★
Management of Technology and Innovation**

This course focuses on the planning, development and implementation of technological capabilities for the purpose of attaining the strategic and operational goals of business organizations. Students are exposed to four themes: integration of technology and strategy; the design of technological strategy; the development of new business around new technology; and the management of corporate research and development, including pre-competitive consortia.

Precludes additional credit for Business 42.461★ (no longer offered).

Prerequisites: Business 42.210★, 42.240★ and 42.228★ (a grade of C- or better in each prerequisite).

Day division, Winter term: Lectures and seminars three hours a week.

**Business 42.468★
History of Business in Canada 1850-1980**

An examination of the place of business in Canadian society, economics and politics. The course covers both the internal dynamics of Canadian business (organization, strategy, the rise of the manager), and its external implications (competition, foreign investment, business-government relations). Business students are required to apply a historical perspective to issues and problems present in the contemporary business environment. (Also listed as History 24.325★.)

Prerequisite: Fourth-year standing in the School of Business.

Not offered 1990-91.

Business 42.469★**Business Policy Seminar**

This course focuses upon the management process in business. It examines the functions and responsibilities of managers in the areas of strategy formulation and implementation. It is designed to integrate previous work in the functional disciplines of business administration by developing an overall analytical viewpoint.

Prerequisite: Fourth-year Honours Business standing.

Day division, Fall and Winter terms: Two hours a week.

Courses Planned for Summer School and Evening Division*Summer School*

The following courses are offered each summer:

Business 42.101★, 42.102★, 42.140★, 42.228★, 42.240★, 42.250★ and 42.308★.

Evening Division

Core courses in the School of Business are available each year in the Evening division. Offerings of additional courses are subject to the availability of instructors.

Dunton Tower, Room 1110
Telephone: 788-2366

Program Committee

Program Co-ordinator
P. Duchemin (English)

Members

K. Abel Canadian Studies/History)
J. Corman (Sociology/Anthropology)
M. Davies (Law)
J. Leblanc (French)
H. Menzies (Canadian Studies)
D. Muise (History)
E. Padolsky (English)
R. Phillips (Art History)
D. Smith (French)
J. Vickers, Director, Institute of Canadian Studies
M. Whittington (Political Science)

General Information

The undergraduate program in Canadian Studies aims to provide students with a broad, multidisciplinary view of Canada while at the same time allowing them to combine their study with disciplinary training in other Arts and Social Science departments if they so desire. Canadian Studies offers Major, Combined Major and Combined Honours programs.

The program forms the undergraduate division of the Institute of Canadian Studies and, like the graduate division of the Institute, benefits from Carleton University's situation in Canada's capital and the richness of material available in Ottawa for such studies.

The program core is designed to accomplish two things. The first is to give the student a broad understanding of Canadian history, culture and society, and the opportunity to study the relationships among various aspects of Canada in some depth. The second is to give the student some competence in French and to encourage further study of the language.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all Committee regulations and requirement as set out below.

Pass Program

Core Credits

The Pass program in Canadian studies requires a core of the following four credits:

1. Canadian Studies 12.100, Introduction to Canadian Studies;
2. French 20.108, Advanced French for Non-Majors, or 20.111, Advanced French(A).
3. Canadian Studies 12.288, Contemporary English-

Canadian and French-Canadian Literature, or a credit with substantial Canadian content in any discipline, at least one-half of which must be taught in French and which is approved by the Program Co-ordinator;*

4. Canadian Studies 12.302, Canadian Studies Seminar.

With permission of the Program Co-ordinator, students with advanced proficiency in the French language may substitute, for the language requirement, a credit in Quebec culture or society that is taught in French. Carleton University courses that may normally be used for this purpose are: French 20.267★, 20.268★, 20.281★, 20.332, 20.381.

A grade-point average of at least 4.0 must be achieved in the required credits of the program core.

**Carleton University courses that may normally be substituted for the French requirement in item 3 are: Political Science 47.201, French 20.267★, 20.268★, 20.281★, 20.332, 20.381.

Program Electives

In addition to the four core credits, the Canadian Studies Pass program student must take the following six credits:

1. One credit Arts and one Social Science credit from the following list:

Arts

Art History 11.202★, Canadian Art: Origins to Present, and 11.300★, Canadian Painting and Sculpture, or 11.301★, Contemporary Canadian Art;
English 18.282, Canadian Literature, or 18.381, Canadian Poetry, or 18.383, Canadian Fiction;
French 20.267★, La littérature du XIXe siècle au Canada français and 20.268★, La littérature du XXe siècle au Canada français;
History 24.233, Canadian Political History, or 24.234, Canadian Social History, or 24.235, Canadian Economic History.

Social Sciences

Economics 43.325, The Economic Development of Canada;
Geography 45.320★, The Canadian City and 45.355★, Contemporary Geographic Issues, or 45.335, Historical Geography of Canada;
Political Science 47.200, Canadian Government and Politics, or 47.201, Introduction à la politique canadienne;
Sociology-Anthropology 56.220, Canadian Society.

2. One Arts and one Social Science credit from the list of courses with substantial Canadian content on pp. 91-92.
3. Two additional credits with substantial Canadian content.

At least two of the program electives must be above the 200 level.

The same course may not be used to satisfy more than one of the alternative French requirements for core courses and the requirements for program electives.

Combined Pass Program

Core Credits

The Combined Pass program in Canadian Studies requires a core of the following four credits:

1. Canadian Studies 12.100, Introduction to Canadian Studies;

2. French 20.108, Advanced French for Non-Majors, or 20.111, Advanced French (A);

3. Canadian Studies 12.288, Contemporary English-Canadian and French-Canadian Literature, *or a credit with substantial Canadian content in any discipline, at least one-half of which must be taught in French, and which is approved by the Program Co-ordinator*;**

4. Canadian Studies 12.302, Canadian Studies Seminar.

With the permission of the Program Co-ordinator, students with advanced proficiency in the French language may substitute, for the language requirement, another course in Quebec culture or society which is taught in French. Carleton University courses that may normally be used for this purpose are: French 20.267★, 20.268★, 20.281★, 20.332, 20.381.

A grade-point average at least 4.0 must be achieved in the required credits of the program core.

**Carleton courses that may normally be substituted for the French requirement in item 3 are: Political Science 47.201, French 20.267★, 20.268★, 20.281★, 20.332, 20.381.

Program Electives

In addition to the four core credits, the Canadian Studies Combined Pass program student must take the following two credits:

1. One credit from the following list:

Art History 11.202★, Canadian Art: Origins to Present, *and* 11.300★, Canadian Painting and Sculpture, *or* 11.301★, Contemporary Canadian Art;

English 18.282, Canadian Literature, *or* 18.381, Canadian Poetry, *or* 18.383, Canadian Fiction;

Economics 43.325, The Economic Development of Canada;

French 20.267★, La littérature de XIXe siècle au Canada français *and* 20.268★, La littérature du XXe siècle au Canada français;

Geography 45.320★, The Canadian City *and* 45.355★, Contemporary Geographic Issues, *or* 45.335, Historical Geography of Canada;

History 24.233, Canadian Political History, *or* 24.234, Canadian Social History, *or* 24.235, Canadian Economic History;

Political Science 47.200, Canadian Government and Politics, *or* 47.201, Introduction à la politique canadienne; Sociology-Anthropology 56.220, Canadian Society.

2. One credit from the list of courses with substantial Canadian content on pp. 91-92.

At least one of the program electives must be above the 200 level.

Students who wish to use one of the courses required by Canadian Studies to fulfil a requirement of their second major discipline may negotiate a substitute course with the Canadian Studies Program Co-ordinator. At least one of the program electives in the Combined Pass degree program must be in the Faculty other than the one from which the student's second major is chosen.

The same course may not be used to satisfy more than one of the alternative French requirements for core courses and the requirements for program electives.

Combined Honours Program

Core Credits

The Combined Honours program in Canadian Studies requires a core of the following five credits:

1. Canadian Studies 12.100, Introduction to Canadian Studies;

2. French 20.108, Advanced French for Non-Majors, *or* 20.111, Advanced French (A);

3. Canadian Studies 12.288, Contemporary English-Canadian and French-Canadian Literature, *or a credit with substantial Canadian content in any discipline, at least one-half of which must be taught in French, and which is approved by the Program Co-ordinator***;

4. Canadian Studies 12.302, Canadian Studies Seminar.

5. Canadian Studies 12.402, Canadian Studies Seminar.

With the permission of the Program Co-ordinator, students with advanced proficiency in the French language may substitute, for the language requirement, a credit in Quebec culture or society that is taught in French. Carleton University courses that may normally be used for this purpose are: French 20.267★, 20.268★, 20.281★, 20.332, 20.381, 20.468★, 20.469★.

Program Electives

In addition to the five Core Credits, the Canadian Studies Combined Honours program requires the following three credits:

1. One credit from the following list:

Art History 11.202★, Canadian Art: Origins to Present, *and* 11.300★, Canadian Painting and Sculpture, *or* 11.301★, Contemporary Canadian Art;

English 18.282, Canadian Literature, *or* 18.381, Canadian Poetry, *or* 18.383, Canadian Fiction;

Economics 43.325, The Economic Development of Canada;

French 20.267★, La littérature de XIXe siècle au Canada français *and* 20.268★, La littérature du XXe siècle au Canada français;

Geography 45.320★, The Canadian City *and* 45.355★, Contemporary Geographic Issues, *or* 45.335, Historical Geography of Canada;

History 24.233, Canadian Political History, *or* 24.234, Canadian Social History, *or* 24.235, Canadian Economic History;

Political Science 47.200, Canadian Government and Politics, *or* 47.201, Introduction à la politique canadienne; Sociology-Anthropology 56.220, Canadian Society.

2. One Arts credit *and* one Social Science credit from the list of courses with substantial Canadian content on pp. 91-92, *one of which must be at the 400 level.*

The same course may not be used to satisfy more than one of the alternative French requirements for core courses and the requirements for program electives.

Mention: français

Students who wish to qualify for the "Mention: français" notation (see pp. 41, 66) in Canadian Studies may do so by fulfilling the requirements listed below, in consultation with the Program Co-ordinator. Courses taken for the "Men-

tion: français" notation may be used to fulfil Pass and Honours degree requirements.

Courses taught in French at the University of Ottawa, or at another university, which are approved by the Program Co-ordinator, may be used to satisfy the "Mention: français" requirements. Students who wish to enrol in University of Ottawa courses for this purpose must do so through the University of Ottawa Exchange Agreement (p. 58). To enrol in courses in French at another university a letter of permission is required (see articles 3.10 and 3.11, p. 59).

Pass or Combined Pass Programs

To graduate with the notation "Mention: français" students must include the following courses in their degree program:

1. One credit in the advanced study of the French language (French 20.112, or another advanced course in French Language).
2. One credit in French-Canadian culture and heritage (French 20.267★, 20.268★, 20.281★, or a course in another appropriate discipline, given in French, which is approved by the Program Co-ordinator. Courses from the University of Ottawa or another university must be approved by the Program Co-ordinator).
3. One credit on a Canadian subject at the 200 or 300 level that is taught in French in any appropriate discipline. For Carleton University courses that may be used to fulfil this requirement, consult the list of courses with substantial Canadian content (pp. 91-92). Courses from the University of Ottawa or another university must be approved by the Program Co-ordinator.
4. Combined Pass program students must meet the "Mention: français" requirements of both disciplines.

Combined Honours Program

To graduate with the notation "Mention: français" students must include the following courses in their degree program:

1. One credit in the advanced study of the French language (French 20.112, or another advanced course in French Language).
2. One credit in French-Canadian culture and heritage (French 20.267★, 20.268★, 20.281★, or a course in another appropriate discipline, given in French, which is approved by the Program Co-ordinator). Courses from the University of Ottawa or another university must be approved by the Program Co-ordinator.
3. One credit on a Canadian subject at the 200 or 300 level, taught in French, in any appropriate discipline. For Carleton University courses that may be used to fulfil this requirement, consult the list of courses with substantial Canadian content (pp. 91-92). Courses from the University of Ottawa or another university must be approved by the Program Co-ordinator.
4. One credit on a Canadian subject at the 400 level, taught in French, including either Canadian Studies 12.493★ and 12.494★, or a directed studies, tutorial, research paper, or course in any appropriate discipline. All written work must be submitted in French. Note that directed studies, tutorials, and research papers are weighted differently in various departments. Courses from the University of Ottawa or another university must be approved by the Program Co-ordinator.
5. Combined Honours program students must meet the "Mention: français" requirements of both disciplines.

Courses Offered

Canadian Studies 12.100

Introduction to Canadian Studies

This course is designed to introduce students to the interdisciplinary study of Canadian society and culture. It introduces a variety of important approaches through the analysis of significant issues from Canada's past and present. Topics may include some of the following: original peoples, language and ethnicity, communications and technology, immigration, arts and culture, economic development, the environment, regionalism, religion, gender, sovereignty, Quebec and English Canada, foreign relations.

Day division: three hours a week.

Canadian Studies 12.288

Contemporary English-Canadian and French-Canadian Literature

This course, which is offered by faculty members from the Departments of French, and English Language and Literature, provides a general introduction to and comparison of the two major literatures of Canada. Lectures are given in both English and French. (Also listed as English 18.288 and French 20.288.)

Precludes additional credit for Canadian Studies 12.188, no longer offered.

Prerequisite: A basic reading knowledge of French, and Second-year standing.

Day division: Three hours a week.

J. Leblanc, E. Padolsky

Canadian Studies 12.302

Canadian Studies Seminar

This course is designed to allow the student to bring together the knowledge acquired in the various disciplines of the program. Each year a different topic or topics are explored in an interdisciplinary perspective. In 1990-91 the theme is *Canada and the Fourth World*.

Prerequisite: Third-year standing in Canadian Studies or permission of the Institute.

Day division: Seminar three hours a week.

M. Davies

Canadian Studies 12.402

Canadian Studies Seminar

This course is designed to allow the Honours student to engage in research and class discussion on topics of an interdisciplinary nature. In 1990-91 the theme is *Technology and the Canadian Mind*.

Evening division: Seminar three hours a week.

H. Menzies

Canadian Studies 12.491★

Directed Studies I

An optional course restricted to Fourth-year Honours students in Canadian Studies and to students doing a Qualifying year in the graduate program of the Institute of Canadian Studies. It includes supervised reading and written work in a Canadian Studies area.

Prerequisite: Permission of the Institute.

Canadian Studies 12.492★

Directed Studies II

An optional course restricted to Fourth-year Honours students in Canadian Studies and to students doing a Qualifying year in the graduate program of the Institute of Canadian Studies. It includes supervised reading and writ-

ten work in a Canadian Studies area.
Prerequisite: Permission of the Institute.

Canadian Studies 12.493★

Etudes dirigées I

Cours facultatif offert seulement aux étudiants de quatrième année Honours en Etudes canadiennes ("Mention: français"). Ce cours comprend des lectures dirigées et des travaux écrits dans un domaine relié aux Etudes canadiennes.

Prerequisite: Permission of the Institute.

Canadian Studies 12.494★

Etudes dirigées II

Cours facultatif offert seulement aux étudiants de quatrième année Honours en Etudes canadiennes ("Mention: français"). Ce cours comprend des lectures dirigées et des travaux écrits dans un domaine relié aux Etudes canadiennes.

Prerequisite: Permission of the Institute.

Courses with Substantial Canadian Content Offered within the Arts and Social Sciences Faculties

Art History

- 11.202★ Canadian Art: Origins to Present
- 11.203★ Arts of Native Peoples: North America
- 11.300★ Canadian Painting and Sculpture
- 11.301★ Contemporary Canadian Art
- 11.302★ Canadian Architecture
- 11.314★ Inuit Art
- 11.315★ North American Indian Art
- 11.400★ Topics in Canadian Art
- 11.403★ Topics in Canadian Native Art
- 11.480★ Topics in Architectural History: Ottawa Architecture (1990-91)

Economics

- 43.320★ Economics of Information and the Media
- 43.325 The Economic Development of Canada
- 43.331★ Social Economics
- 43.341★ Regional Economics
- 43.344★ Economic Thought and Policy in Canada
- 43.347★ Public Finance: Taxation
- 43.348★ Public Finance: Expenditure
- 43.380★ Topics in Canadian Economic Policy

English Language and Literature

- 18.288 (Canadian Studies 12.288) Contemporary English-Canadian and French-Canadian Literature
- 18.282 Canadian Literature
- 18.381 Canadian Poetry
- 13.383 Canadian Fiction
- 18.387 Selected Topic in Canadian Literature
- 18.481★ Selected Topic in Canadian Poetry
- 18.483 Studies in the Literature of Quebec and English Canada
- 18.486★ Studies in Canadian Literature I
- 18.487★ Studies in Canadian Literature II

Film Studies

- 19.328 The Canadian Cinema

French

- 20.163 Introduction to Literature: French Canadian Texts from the End of the Nineteenth Century to the Present

- 20.267★ La littérature du XIXe siècle au Canada français
- 20.268★ La littérature du XXe siècle au Canada français (Canadian Studies 12.288) Contemporary English-Canadian and French-Canadian Literature
- 20.332 Français canadien
- 20.363 Etudes Littéraires: L'essai au Canada français
- 20.364 Le Théâtre: théâtre québécois moderne
- 20.381 Aspects de la littérature canadienne-française: écrivains québécois
- 20.461 Littérature d'idées (I): Jacques Godbout
- 20.468★ Aspects de la littérature canadienne-française I
- 20.469★ Aspects de la littérature canadienne-française II

Geography

- 45.230★ The Cultural Landscape
- 45.318★ Soil Properties
- 45.319★ Soils and Environment
- 45.320★ The Canadian City: Internal Structure and Contemporary Problems
- 45.323★ Urban Revitalization
- 45.333★ Municipal Land Use Planning in Canada
- 45.334★ Renewable Resource Planning in a Local Area
- 45.335 Historical Geography of Canada
- 45.351★ Northern Lands
- 45.355★ Canada: Contemporary Geographic Issues
- 45.370★ Population Geography
- 45.427★ Urban Development and Analysis
- 45.442★ Transportation Geography
- 45.443★ Issues in Applied Geography
- 45.444★ Outdoor Recreational Lands Use

History

- 24.130 Modern Canada
- 24.233 Canadian Political History
- 24.234 Canadian Social History
- 24.235 Canadian Economic History
- 24.324★ Colonial Frontier Societies
- 24.325★ History of Business in Canada 1850-1980
- 24.326★ Old Canada, 1740s-1850s
- 24.329★ Canadian Urban History
- 24.330★ The History of Upper Canada to 1867
- 24.331★ Quebec Since the 1860s
- 24.332★ The Atlantic Provinces
- 24.333★ The History of Ontario, 1867-1967
- 24.334★ Canada-United States Relations
- 24.335 History of Canadian Labour
- 24.336★ Canadian External Relations
- 24.337★ Development and Underdevelopment in Atlantic Canada, 1660-1960
- 24.338★ Canadian Immigration and Settlement
- 24.339★ History of the Prairie West
- 24.340★ History of Canadian Socialism
- 24.350 Modern British and Canadian Constitutional History
- 24.351★ Selected Topics in Canadian History
- 24.352★ Aboriginal Peoples of British North America to 1867
- 24.353★ Aboriginal Peoples of Canada Since 1867
- 24.355★ History of British Columbia
- 24.421 Science and Technology in the Canadian Experience
- 24.422 The Maritimes in Transition, 1840s to 1890s
- 24.423 The Indian Peoples of Northern Canada
- 24.424 Canadian Immigration and Ethnic History
- 24.425 Selected Problems in the Political Economy of Canadian Labour
- 24.430 Colonial Society in British North America
- 24.431 Canada from Confederation to the Great War
- 24.432 Acadian and Quebec Society before 1763

- 24.433 Selected Problems in Canadian Business History, 1850-1980
- 24.434 History of Northern Canada
- 24.435 Elites and Elite Formation in Canadian Society, 1800-1925
- 24.437 Canada From War to War
- 24.438 Studies in Canadian Popular Culture
- 24.439 Modern Canada Since 1939

Italian

- 26.362 The Italian Heritage in North America

Law

- 51.100 Introduction to Legal Studies
- 51.203 Introduction to Private Law Relationships
- 51.204 Introduction to Criminal Law in Context
- 51.205 Introduction to Public Law
- 51.301★ Women and the Legal Process
- 51.302★ Canadian Legal Profession
- 51.303★ Contracts
- 51.336★ Criminal Law: Process and Politics
- 51.337★ Young Offenders and the Law
- 51.341★ Employment Law
- 51.345★ Labour Law
- 51.348★ Legal Aspects of Sport
- 51.350★ Constitutional Law
- 51.351★ Communications Law I
- 51.352★ Communications Law II
- 51.353 Civil Liberties and Human Rights
- 51.354★ Law and Native Peoples of Canada
- 51.380★ Law of Environmental Quality
- 51.384 Law of the Family
- 51.406★ Church and State in the Laws of England, Scotland and Canada
- 51.435★ Criminal Justice Reform: Theory and Practice
- 51.438★ Sentencing Theories and Practice
- 51.440★ The Arbitration Process in Industrial Relations
- 51.445★ Labour Relations in the Public Service
- 51.456★ Administrative Law I
- 51.457★ Administrative Law II
- 51.467★ Immigration and Refugee Law
- 51.491★ Tutorial in Law
- 51.492★ Tutorial in Law

Music

- 20.310 Music in Canada

Philosophy

- 32.202 Ideas of the Individual and Society in Canada

Political Science

- 47.200 Canadian Government and Politics
- 47.201 Introduction à la politique canadienne
- 47.300 Canadian Provincial Politics
- 47.301★ Canadian Provincial Government and Intergovernmental Relations
- 47.302★ Canadian Municipal Government
- 47.303★ Canadian Urban Politics
- 47.304★ Political Parties and Elections in Canada
- 47.305★ Ontario Government and Politics
- 47.306★ Social Power in Canadian Politics
- 47.335★ Canadian Political Ideas
- 47.336★ Canadian Political Culture
- 47.340 Canadian Public Administration
- 47.345★ Comparative Public Policy Analysis
- 47.366★ Canadian Foreign Policy
- 47.367★ Canadian Defence Policy
- 47.400 Topics in Canadian Government and Politics
- 47.401 Canadian Public Policy

- 47.402★ Policy Seminar: Problems of Northern Development
- 47.403★ Politics and the Media
- 47.405 Federalism
- 47.406★ Legislative Process in Canada
- 47.407★ The Politics of Law Enforcement in Canada
- 47.408★ National Security and Intelligence in the Modern State
- 47.409★ Politics in Quebec
- 47.410★ Canadian and Comparative Local Government and Politics
- 47.411★ French-English Relations
- 47.416★ Labour and the Canadian State
- 47.417★ Political Participation in Canada
- 47.441★ Business-Government Relations in Canada

Sociology and Anthropology

- 56.220 Canadian Society
- 26.241 Kinship, Marriage and the Family
- 53.247 Women in Society
- 53.252★ Sociology of Aging and the Elderly
- 53.256★ Police in Society
- 54.318★ The Prehistory of New World Native Peoples
- 54.319★ Issues in Canadian Native Studies
- 56.320 French Canada and Quebec Society
- 53.373★ Criminal Justice Policy
- 53.377★ Sociology of Welfare Institutions
- 53.380 Social Policy
- 56.465★ Selected Problems in the Study of Ethnic and Race Relations
- 54.470★ Selected Problems in the Study of North American Native Peoples
- 53.485★ Contemporary Problems in Sociology: Sexuality and Reproduction in Feminist Theory (1990-91)

Women's Studies

- 09.491★ (Sociology 53.486★) Selected Topics in Women's Studies I

The School of Journalism offers the following courses with substantial Canadian content:

Journalism

- 28.306★ Comparative Media Studies
- 28.351★ Communications Law I
- 28.352★ Communications Law II

Mass Communication

- 27.211 The Mass Media in Modern Society
- 27.430★ Policy: Theory and Foundations
- 27.432★ Policy: Institutions and Practices

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Officers of Instruction

Chairman
T.R. Robinson

Professors
R.C. Blockley
A. Trevor Hodge

Associate Professors
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A.S. Fotiou
R.L. Jeffreys
T.R. Robinson
M.E. Welsh

Adjunct Professor
Peter Arnott

General Information

The discipline of Classics is divided into three main fields: Latin, Greek and Classical Civilization. By "Latin" and "Greek" are meant works of Latin and ancient Greek literature studied in the original tongue, not in translation; "Classical Civilization" covers all non-linguistic studies in classical antiquity, such as ancient history and literature in translation.

Honours and Pass programs exist in Latin alone and Greek alone, and in Classical Civilization alone. Combined Honours and Combined Pass programs are available in a combination of any two of the three fields, i.e., Latin and Greek, Latin and Classical Civilization, Greek and Classical Civilization.

Combined Honours and Combined Pass programs can also be arranged combining any of the three with work in another department (for example, Religion and Classical Civilization; Latin and French) upon consultation with the department chairmen concerned.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Pass Programs

Pass Program in Greek

Five Greek credits beyond the 100 level and Classical Civilization 13.290.

Pass Program in Latin

Five Latin credits beyond the 100 level and Classical Civilization 13.291.

Pass Program in Classical Civilization

Six Classical Civilization credits and a full credit in either Greek or Latin at the 100 level, or the equivalent.

Students must include in the program Classical Civilization 13.209 and either 13.290 or 13.291; the equivalent of one credit from Classical Civilization 13.321★, 13.322★, and 13.323★; one from Classical Civilization 13.300, 13.312 and 13.328; and options in Classical Civilization equivalent to two credits.

Combined Pass Program within the Department

Greek and Classical Civilization

Four Greek credits beyond the 100 level and four Classical Civilization credits to include 13.209 and 13.290.

Latin and Classical Civilization

Four Latin credits beyond the 100 level and four Classical Civilization credits to include 13.209 and 13.291.

Greek and Latin

Four credits beyond the 100 level in both Greek and Latin and either Classical Civilization 13.290 or 13.291.

Combined Pass Program with Another Department

In addition to the requirements of the other department, one of the following will be required:

Greek

Four Greek credits beyond the 100 level and Classical Civilization 13.290.

Latin

Four Latin credits beyond the 100 level and Classical Civilization 13.291.

Classical Civilization

Five Classical Civilization credits. Students must include in the program Classical Civilization 13.209, 13.290, 13.291 and at least one credit at the 300 level.

All courses are to be chosen in consultation with the Department.

Honours Programs

Honours Program in Greek

Seven Greek credits beyond the 100 level and Classical Civilization 13.209 and 13.290.

Honours Program in Latin

Seven Latin credits beyond the 100 level and Classical Civilization 13.209 and 13.291.

Honours Program in Classical Civilization

Nine Classical Civilization credits; Greek 15.201 or Latin 16.201; a full credit at the 100 level in the other language.

Classical Civilization courses must include 13.209, either 13.290 or 13.291, either 13.300 or 13.312 or 13.328, two of 13.321★, 13.322★ and 13.323★, and 13.427 or 13.428 or 13.429; Classical Civilization options equivalent to four credits.

Combined Honours Program within the Department

Greek and Classical Civilization

Six Greek credits beyond the 100 level, five Classical

Civilization credits to include 13.209 and 13.290, and a full credit in Latin at the 100 level.

Latin and Classical Civilization

Six Latin credits beyond the 100 level, five Classical Civilization credits to include 13.209 and 13.291 and a full credit in Greek at the 100 level.

Greek and Latin

Either 12 credits beyond the 100 level in Greek and Latin (at least five credits in each language); or five credits beyond the 100 level in both Greek and Latin and two Classical Civilization credits.

Combined Honours Program with Another Department

In addition to the requirements of the other department, one of the following will normally be required:

Greek

Six Greek credits beyond the 100 level and Classical Civilization 13.290.

Latin

Six Latin credits beyond the 100 level and Classical Civilization 13.291.

Classical Civilization

Six Classical Civilization credits to include 13.209, 13.290 or 13.291 and 13.427 or 13.428 or 13.429, and a full credit in either Greek or Latin at the 100 level.

Chemistry of Art and Artifacts

The attention of students interested in archaeology is directed to Chemistry 65.107, The Chemistry of Art and Artifacts. The course, designed for archaeologists and historians dealing with the deterioration and preservation of artifacts and works of art, is strongly recommended by the Department as an option.

Courses Offered

• Greek

Greek 15.105★

Introduction to Classical Greek I

A course for beginners in ancient Greek, designed to give students a grasp of basic grammatical forms and vocabulary (with reference to English derivatives) through the reading of continuous Greek.

Day division, Fall term: Lectures and practice periods four hours a week.

Greek 15.106★

Introduction to Classical Greek II

A course for students with some previous knowledge of the language: study of grammatical forms and constructions; acquisition of reading skills.

Prerequisite: Greek 15.105★ or equivalent.

Day division, Winter term: Lectures and practice periods four hours a week.

Greek 15.115

Beginning Classical Greek

Not offered 1990-91.

Greek 15.116

Beginning Modern Greek

Not offered 1990-91.

Greek 15.201

Intermediate Classical Greek

Further study of the language; reading of selected prose and poetry by ancient Greek authors.

Prerequisite: Greek 15.106★ or equivalent.

Day division: Lectures three hours a week.

Greek 15.213★

Comedy I

Introductory readings in Greek comedy.

Prerequisites: Greek 15.201 and concurrent registration (or previous credit) in Greek 15.250★ or permission of the Department.

Day division: Tutorial one and a half hours a week, throughout the year.

Greek 215★

Epic I

Introductory readings in Greek epic.

Prerequisites: Greek 15.201 and concurrent registration (or previous credit) in Greek 15.250★, or permission of the Department.

Day division: Tutorial one and a half hours a week, throughout the year.

Greek 15.250★

Translation I

A course designed to improve the students' proficiency in sight translation from Greek and to give practice in translation from English into Greek (prose composition).

Prerequisite: Greek 15.201 or permission of the Department.

Day division: Tutorial one and a half hours a week, throughout the year.

Greek 15.313★

Comedy II

Intermediate readings in Greek comedy.

Prerequisite: The equivalent of two full credits in Greek at the 200 level.

Day division: Tutorial one and a half hours a week, throughout the year.

Greek 15.315★

Epic II

Intermediate readings in Greek epic.

Prerequisite: The equivalent of two full credits in Greek at the 200 level.

Day division: Tutorial one and a half hours a week, throughout the year.

15.350★

Translation II

An advanced sequel to Greek 15.250★.

Prerequisite: Greek 15.250★ or permission of the Department.

Day division: Tutorial one and a half hours a week, throughout the year.

Greek 15.413★

Comedy III

Advanced readings in Greek comedy.

Prerequisite: The equivalent of one full credit in Greek at the 300 level.

Day division: Tutorial one and a half hours a week, throughout the year.

Greek 15.415★

Epic III

Advanced readings in Greek epic.

Prerequisite: The equivalent of one full credit in Greek at

the 300 level.

Day division: Tutorial one and a half hours a week, throughout the year.

Other courses to be offered in rotation in coming years are:

Greek 15.211★
The Tragedians I

Greek 15.212★
The Orators I

Greek 15.214★
Lyric and Elegy I

Greek 15.216★
The Historians I

Greek 15.217★
The Philosophers

Greek 15.311★
The Tragedians II

Greek 15.312★
The Orators II

Greek 15.314★
Lyric and Elegy II

Greek 15.316★
The Historians II

Greek 15.317★
The Philosophers II

Greek 15.411★
The Tragedians III

Greek 15.412★
The Orators III

Greek 15.414★
Lyric and Elegy III

Greek 15.416★
The Historians III

Greek 15.417★
The Philosophers III

Greek 15.490★
Directed Study (Poetry)

Greek 15.491★
Directed Study (Prose)

• Latin

Latin 16.105★
Introduction to Latin I

A course for beginners in Latin, designed to give students a grasp of basic grammatical forms and vocabulary (with reference to English derivatives) through the reading of continuous Latin.

Day and Evening divisions, Fall term: Lectures and practice periods four hours a week.

Latin 16.106★
Introduction to Latin II

A course for students with some previous knowledge of the

language: study of grammatical forms and constructions; acquisition of reading skills.

Prerequisite: Latin 16.105★ or equivalent.

Day and Evening divisions, Winter term: Lectures and practice periods four hours a week.

Latin 16.115
Beginning Latin
Not offered 1990-91.

Latin 16.201
Intermediate Latin
Further study of the language; reading of selected prose and poetry by Latin authors.
Prerequisite: Latin 16.106★ or equivalent.
Day division, Lectures three hours a week.

Latin 16.213★
The Historians I
Introductory readings in the Roman historians.
Prerequisite: Latin 16.201 and concurrent registration (or previous credit) in Latin 16.250★ or permission of the Department.
Day division, Fall term: Tutorial three hours a week.

Latin 16.218★
Virgil and the Epic I
Introductory readings in Virgil.
Prerequisites: Latin 16.201 and concurrent registration (or previous credit) in Latin 16.250★ or permission of the Department.
Day division, Winter term: Tutorial three hours a week.

Latin 16.250★
Translation I
A course designed to improve the students' proficiency in sight translation from Latin and to give practice in translation from English into Latin (prose composition).
Prerequisite: Latin 16.201 or permission of the Department.
Day division: Tutorial one and half hours a week, throughout the year.

Latin 16.313★
The Historians II
Intermediate readings in the Roman historians.
Prerequisite: The equivalent of two full credits in Latin at the 200 level.
Day division, Fall term: Tutorial three hours a week.

Latin 16.318★
Virgil and the Epic II
Intermediate readings in Virgil.
Prerequisite: The equivalent of two full credits in Latin at the 200 level.
Day division, Winter term: Tutorial three hours a week.

Latin 16.350★
Translation II
An advanced sequel to Latin 16.250★.
Prerequisite: Latin 16.250★ or permission of the Department.
Day division: Tutorial one and a half hours a week, throughout the year.

Latin 16.413★
The Historians III
Advanced readings in the Roman historians.
Prerequisite: The equivalent of one full credit in Latin at the 300 level.
Day division, Fall term: Tutorial three hours a week.

Latin 16.418★

Virgil and the Epic III

Advanced readings in Virgil.

Prerequisite: The equivalent of one full credit in Latin at the 300 level.

Day division, Winter term: Tutorial three hours a week.

Other courses to be offered in rotation in coming years:

Latin 16.211★

Lyric and Elegy I

Latin 16.212★

Drama I

Latin 16.214★

The Orators I

Latin 16.215★

The Philosophers I

Latin 16.216★

Satire I

Latin 16.217★

Letters I

Latin 16.311★

Lyric and Elegy II

Latin 16.312★

Drama II

Latin 16.314★

The Orators II

Latin 16.315★

The Philosophers II

Latin 16.316★

Satire II

Latin 16.317★

Letters II

Latin 16.411★

Lyric and Elegy III

Latin 16.412★

Drama III

Latin 16.414★

The Orators III

Latin 16.415★

The Philosophers III

Latin 16.416★

Satire III

Latin 16.417★

Letters III

Latin 16.490★

Directed Study (Poetry)

Latin 16.491★

Directed Study (Prose)

• **Classical Civilization**

Classical Civilization 13.100

Some Aspects of Greek and Roman Civilization

An introduction to classical Greek and Roman antiquity, which discusses topics characteristic of the two civilizations. There will be appropriate readings from classical authors in English translation.

Day division: Lectures two hours a week.

Classical Civilization 13.102★

Aspects of Greek Civilization

An introduction to Greek antiquity in which the main characteristics of classical Greece are discussed. There are appropriate readings from Greek authors in translation.

Day and Evening divisions, Fall and Winter terms: Lectures two hours a week.

Classical Civilization 13.103★

Aspects of Roman Civilization

An introduction to ancient Rome in which the main characteristics of Roman civilization are discussed. There are appropriate readings from Latin authors in translation.

Day and Evening divisions, Fall and Winter terms: Lectures two hours a week.

Classical Civilization 13.119

History of the Ancient World

An introduction to the history of ancient Europe and the Near East, with a concentration upon the characteristic political, military and social institutions. Although emphasis is placed upon Greece and Rome, attention is also given both to earlier civilizations and to other contemporary ones.

Evening division: Lectures two hours a week.

Note:

Only one full credit may be earned from Classics 13.100, 13.102★ and 13.103★ and 13.119.

Classical Civilization 13.209

Greek and Roman Literary Genres

A study through English translation of the various genres of Greek and Latin literature, especially those which influenced later European writings: epic, drama, the ode, pastoral poetry, satire. (Also listed as English 18.209.)

Day division: Lectures two hours a week.

Classical Civilization 13.231

Methods and Techniques of Archaeology

The interrelation of archaeology and anthropology, history, classics, art history, etc. Techniques of field archaeology such as stratigraphy, air photography, surveying, Carbon 14, typology and seriation, underwater archaeology, laboratory analysis: and the organization and administration of a major excavation.

Evening division: Lectures two hours a week.

Classical Civilization 13.232★

Greek and Roman Art and Archaeology

The art, architecture and archaeology of Greece and Rome. Vase painting, sculpture, Greek and Roman architecture, town planning and analogous arts are studied. (Also listed as Art History 11.210★.)

Day division, Winter term: Lectures two hours a week.

Classical Civilization 13.235

Ancient Science and Technology

The development of science and technology in the ancient world and their practical application in such fields as ancient engineering, machinery, metallurgy, transport, building, agriculture and Hippocratic medicine: the position of the

craftsman and artisan in society, the attitude of the intellectuals to science and manual labour, and the effect upon technological development of the institution of slavery. This course is suitable for students with no previous knowledge of Greece or Rome.

Evening division: Lectures two hours a week.

Classical Civilization 13.240

Greek Philosophy

Offered in the Department of Philosophy as Philosophy 32.205.

Classical Civilization 13.290

History of Ancient Greece

The history of classical Greece to the conquest of Asia by Alexander with special attention to the development of her characteristic institutions. (Also listed as History 24.290.)

Evening division: Lectures two hours a week.

Classical Civilization 13.291

History of Ancient Rome

The history of ancient Rome, her organization and expansion especially during the late Republic and early Empire. (Also listed as History 24.291.)

Day division: Lectures two hours a week.

Classical Civilization 13.300

Classical Mythology

A study of classical mythology, emphasizing its use in Greek and Roman literature and its place in classical art and religion. There is some discussion of classical myths in terms of contemporary interpretations of myth. (All texts used will be in English.)

Day division: Lectures two hours a week.

Classical Civilization 13.302

The Later Roman Empire

A study of major developments – administrative, ecclesiastical, cultural and societal – of the later Roman Empire. (Also listed as History 24.302.)

Day division: Lectures two hours a week.

Classical Civilization 13.303

The History of the Byzantine Empire, 527-1453 A.D.

The history of the Byzantine empire from Justinian the Great in the sixth century A.D. to the fall of Constantinople in 1453 A.D. Special attention is given to the cultural, religious and institutional development of Byzantium and their impact on the Slavic, Western European and Islamic countries. (Also listed as History 24.303.)

Not offered 1990-91.

Classical Civilization 13.305

Sites and Civilization

Not offered 1990-91.

Classical Civilization 13.312

Greek and Roman Drama

A study in translation of Greek and Roman tragedy and comedy; the origins, character and development of the ancient theatre.

Day division: Lectures two hours a week.

Classical Civilization 13.321★

Studies in Greek History and Institutions

A study of one of the major periods of ancient Greek history. Special topic for 1990-91: *The Early Byzantine Era*. (Also listed as History 24.309★.)

Prerequisite: A course in ancient history or permission of the Department.

Day division, Fall term: Lectures two hours a week.

Classical Civilization 13.322★

Studies in Roman History and Institutions

A study of one of the major periods or themes of the history of ancient Rome. Special topic for 1990-91: *The Augustan Age*. (Also listed as History 24.311★.)

Prerequisite: A course in ancient history or permission of the Department.

Day division: Fall term: Lectures two hours a week.

Classical Civilization 13.323★

Studies in Ancient History and Institutions

A study of a selected topic in the history of ancient Greece and Rome. (Also listed as History 24.314★.)

Prerequisite: A course in ancient history or permission of the Department.

Not offered 1990-91.

Classical Civilization 13.328

Greek and Roman Literature and Thought

An investigation of the values, ideas and achievement expressed in the writing of the Classical world. Topics covered include didactic poetry, the letter writers, the historians as literary artists, oratory and rhetoric, literary criticism, philosophical prose, the novel. All the texts dealt with are English translations.

Prerequisite: Classical Civilization 13.100 (or 13.102★ and 13.103★) or 13.209 or permission of the Department.

Not offered 1990-91.

Classical Civilization 13.331★

Pre-Classical Greek Art and Archaeology

The art, architecture and archaeology of the Minoan, Mycenaean and Cycladic civilizations. With emphasis on vase painting, architecture, small finds and frescoes, the course documents the development of art in the Aegean area down to the emergence of Greece into the historical era around 600 B.C. (Also listed as Art History 11.304★.)

Day division, Fall term: Lectures two hours a week.

Classical Civilization 13.334★

Etruscan and Roman Art

Offered in the Department of Art History as Art History 11.310★.

Classical Civilization 13.402

Beginnings of Early Medieval Europe and the Near East

Offered in the Department of History as History 24.402.

Classical Civilization 13.427

Selected Topic in Classical History and Literature

A seminar on historical and literary aspects of a particular period of antiquity. Intended for Third- and Fourth-year students.

Prerequisite: Permission of the Department.

Not offered 1990-91.

Classical Civilization 13.428

Selected Topics in Greek and Roman Literature

Intended for Third- and Fourth-year students.

Prerequisite: Permission of the Department

Not offered 1990-91.

Classical Civilization 13.429

Selected Topics in Greek and Roman History

Intended for Honours students in history and classics who should normally be in the Third or Fourth years. Special topic for 1990-91: *Alexander the Great*. (Also listed as History 24.429.)

Prerequisite: Permission of the Department.

Day division: Seminar two hours a week.

Classical Civilization 13.431

Archaeological Field Work

Offered Summer 1990.

Not offered Fall/Winter 1990-91.

Classical Civilization 13.490★, 13.491★, 13.492★

Directed Readings and Research

These courses consist of supervised readings and research projects in a specific area of Classical Civilization to be chosen in consultation with the Honours Supervisor.

Prerequisite: Fourth-year Honours standing and permission of the Department.

Comparative Literature

99

Dunton Tower, Room 1726
Telephone: 788-2177

Members of the Committee

Chairman

To be announced

Assistant Chairman

F.G. Loriggio (*Italian and Comparative Literature*)

Members

J.B. Dallett (*German*)

F. de Toro (*Comparative Literature*)

A. Elbaz (*French*)

A.W. Halsall (*French*)

J.J. Healy (*English*)

P. Laurette (*French*)

C.A. Marsden (*Spanish*)

M. Marshall, *Dean of the Faculty of Social Sciences, ex officio*

R.M. Polzin (*Religion*)

H.-G. Ruprecht (*Linguistics and Comparative Literature*)

E.Z.S. Sarkany (*French*)

E. Voldeng (*French*)

S.F. Wise, *Dean of the Faculty of Graduate Studies and Research, ex officio*

G.A. Woods (*Comparative Literature*)

J. Yalden, *Dean of the Faculty of Arts, ex officio*

General Information

The focus of the Comparative Literature program is the study of literature in its international context and the comparison of literary phenomena usually studied in isolation because of linguistic barriers and the traditional departmental division of academic disciplines. Taking into account the interrelation of all humanistic studies such as the various literatures, philosophy, psychology, sociology, the visual arts and history, "comparatists" view literary creation within the total complex evolution of world literature. The historical flow of literary archetypes, the role of folklore and myth in literature, recurrent problems of literary theory, and consideration of the less well known literatures of the world, are some of the objects of comparative literature studies. Although there is no undergraduate degree program in Comparative Literature at Carleton, students of other subjects may find it illuminating to take courses in comparative literature as an enhancement of their degree programs. They may also submit a coherent pattern of courses in comparative literary studies for a B.A. Pass or Honours (Directed Interdisciplinary Studies), in accordance with the procedures described for this degree in the Calendar, p. 104.

In their choice of courses students must first be guided by the requirements of the degree program of their choice. However, those intending to proceed to the M.A. in Comparative Literature will need to acquire a competence in more than one language other than English and a familiarity with more than one national literature. Assistance in planning a pattern of courses is available to interested students from members of the Comparative Literature Committee. However, the following courses from departments in the Faculty of Arts would be particularly appropriate for consideration by those who intend to emphasize comparative literary studies in the courses they take for their B.A.

First Year

Art History

11.110★ Western Art: Prehistory to Medieval

11.111★ Western Art: Renaissance to the Present

11.115★ Art as Visual Communication

Classics

13.102★ Aspects of Greek Civilization

13.103★ Aspects of Roman Civilization

English Language and Literature

18.101 English and Continental Texts

18.162 Twentieth-Century Literature

18.288 Contemporary English-Canadian and French-Canadian Literature

French

20.288 Contemporary English-Canadian and French-Canadian Literature

Film Studies

19.100 Introduction to Film Studies

Linguistics

29.100 Introduction to Linguistics

Music

30.100 Introduction to Music

Religion

34.102★ Introduction to the Literature of the Hebrew Bible (Old Testament)

Second Year

Art History

11.203★ Arts of Native Peoples: The Americas

11.204★ Arts of Native Peoples: Africa and Oceania

Classics

13.209 Greek and Roman Literary Genres

English Language and Literature

18.206 Children's Literature

18.208 Myth and Symbol

18.290★ Literature of the Self

18.296 The Writer, Literature and Society

Film Studies

19.268 Forms and Conventions of the Cinema

Italian

26.260 Introduction to the Culture of Italy

Linguistics

29.271★ Sociolinguistics

29.280 Language and Communication

Russian

36.260 Russian Literature in English Translation – Nineteenth and Twentieth Centuries

36.291 Twentieth Century East European Literature in English Translation

Third Year

Classics

13.300 Classical Mythology

13.312 Greek and Roman Drama

13.328 Greek and Roman Literature and Thought

English Language and Literature

18.300 Literary Criticism from Aristotle to the Present

18.322 Chaucer and the Literature of Medieval England

Comparative Literature 100

18.390 The Literature of Existentialism

Film Studies

- 9.315 Questions of Documentary Practice
- 9.333 Film and Society
- 9.350 Film Theory

Italian

- 26.340 Development of Literary Genres from the Thirteenth Century Renaissance
- 26.342 Development of Literary Genres from the Baroque to the Present
- 26.362 Italian Heritage in North America

Russian

- 36.360★ Literature in English Translation – Dostoevsky to Chekhov
- 36.361★ Literature in English – The Revolution and After

Fourth Year

Art History

- 11.431 Topics in Iconography

Classics

- 13.428 Selected Topics in Greek and Roman Literature

English Language and Literature

- 18.483 Studies in the Literature of Quebec and English Canada
- 18.496★ Studies in African or Caribbean Literature
- 18.497★ Studies in Australian and New Zealand Literature or Indian Literature in English

Attention is also drawn to the value of taking courses that parallel one another in more than one literature, such as English 18.322, Chaucer and the Literature of Medieval England, and German 22.430, Medieval Language and Literature. Students thinking of proceeding to the M.A. in Comparative Literature may wish to consult the Graduate Calendar, which contains recommended course patterns. Students registered in other language departments who wish to enrol in one or more courses in the Comparative Literature M.A. program must demonstrate a reading knowledge of the languages required for each course. Such students are encouraged to emphasize their own area of literary study in presentations and essays when the instructor judges that the content of the course(s) so permits.

Interested students are invited to contact the Chairman in Room 1726, Dunton Tower.

The Comparative Literature Committee offers a program of graduate study leading to the degree of Master of Arts. The Committee makes available some of its courses as options for qualified undergraduates and graduates who are registered in other disciplines and are appreciative of the broader perspectives offered by comparative literature.

Courses Offered

Comparative Literature 17.203

Modern Fiction: Representative Texts (Europe/North and Latin America)

A study of representative texts – from the twentieth century – to include writing in Europe and North and Latin America. The purpose is to make available a wide range of texts that have particular cross-referential significance. The reading list includes writers such as Kafka, Gide, Pasternak, Mann, Faulkner, Woolf, Joyce, Celine, Musil, Proust, Borges, Dinesen, with essays from current theoretical writing in the

areas of structuralism, post-structuralism and semiotics. All readings are in English.

Prerequisite: Second-year standing or higher.

Day division: Three hours a week.

Comparative Literature 17.204★

Japanese Literature (In English Translation)

The course introduces students to the traditions of Japanese literature, and to contemporary writing in Japanese, through the study of representative texts. It provides a complement to the historical and cultural study of the Far East. All texts are read in English translation.

Prerequisite: Second-year standing or higher.

Day division: Three hours a week.

Comparative Literature 17.205★

Chinese Literature (In English Translation)

The course introduces students to the traditions of Chinese literature, and to contemporary writing in Chinese, through the study of representative texts. It provides a complement to the historical and cultural study of the Far East. All texts are read in English translation.

Prerequisite: Second-year standing or higher.

Day division: Three hours a week.

Comparative Literature 17.301

Twentieth-Century Masterpieces of Literature: Production and Response

This course explores the cultural settings and contributions of literary Modernism (in the period 1900 to the present) through the study of its major texts, including poetry, fiction and drama. Comparative critical perspectives are developed, and an emphasis is placed on methods of interpretation. English translations are used (with optional readings for students with a language other than English).

Prerequisite: a university course in literature, or permission of the Committee.

Day division: Three hours a week.

G.A. Woods

Comparative Literature 17.304★

Special Topic in Theatre

Topic for 1990-91: Study of the major modes of theatrical production, theories of acting and staging, social context and cross-cultural affinities in the twentieth century's theatre practice, from Stanislavsky to Barab, including Meyerhold, Craig, Artaud, Brecht and Grotowski. Texts are read in English.

Prerequisite: A course in drama or permission of the Comparative Literature Committee.

F. de Toro

Comparative Literature 17.361

Studies in Literary Genres

Not offered 1990-91.

Comparative Literature 17.401★

Foundations of Comparative Literature

The history of the discipline of comparative literature is studied, including its beginning in nineteenth-century France, its evolution, and its current status in Europe, the United States and Canada.

Prerequisite: Permission of the Committee.

Evening division, Fall term: Three hours a week.

F. de Toro

Comparative Literature 17.402★

Theories of Literature

The course focuses on twentieth-century literary theories in the context of comparative studies, providing the student with an over-all view of the theoretical discussion of litera-

ture from about 1920 to the present. Included in the study are Russian Formalism, American New Criticism, and such other approaches as the structuralist, semiotic, socio-cultural and hermeneutic.

Prerequisite: Permission of the Committee. Students enrolling in this course under the cross-listed number Spanish 38.402★ should note the requirements of the Department of Spanish.

Evening division, Fall term: Three hours a week.

F. Loriggio

Comparative Literature 17.403

Selected Topic in Comparative Literature

Studies of a selected topic are available on a tutorial basis, subject to agreement between students and instructors.

Prerequisite: Permission of the Committee.

Program Co-ordinator
R.P. Saunders

Placement Supervisor
C. Picard

Office
S. Rochon
788-2588

General Information

The concentration in Criminology and Criminal Justice provides students with the opportunity for focused study relating to crime and criminal justice. It allows students to take courses in the area while completing a Pass or Honours program in the disciplines of Sociology-Anthropology, Psychology or Law. These courses enable the student to be exposed to the variety of topics and approaches one needs in order to master this broad field. When students choose to concentrate in this area, two sets of courses are required:

1. Concentration Requirements.
2. Disciplinary Requirements.

The first set includes those required courses that deal with Criminology and Criminal Justice. The second set refers to those courses required to complete the particular Pass or Honours program chosen (i.e., Law, Sociology-Anthropology or Psychology, or a Combined Major or Combined Honours in any two of Sociology-Anthropology, Psychology and Law).

Admission to the Concentration

This is a limited enrolment concentration.

Since 1985-86, students have been considered for admission to the concentration only as they prepare to enter Third year, i.e., after they have completed at least eight credits. (Students who were admitted to the concentration before 1985-86, and who are eligible to continue, are permitted to complete their program of study.)

Admission will be based on the grade-point average achieved in *specific* courses. These courses are: Psychology 49.100; Law 51.100; one of Sociology 53.100, Anthropology 54.100 or Sociology-Anthropology 56.100; Law 51.204; and Sociology 53.255★ and 53.271★ (formerly 53.270). The grade-point average will be based on *as many of these five credits as have been completed*. In order to be considered for admission, at least *three* of the five credits listed above must have been completed. A floating minimum grade-point average will be used to determine admission to the concentration. That is, the students with the highest grade-point average in the courses referred to above will be admitted to the concentration.

Carleton students applying for the concentration must do so through their Registrar's Office *no later than May 1* to be considered for a space in the concentration. Students from other institutions should consult the admissions section of this Calendar for deadlines and procedures.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and the requirements as set out below.

Concentration Requirements

1. Psychology 49.100; Law 51.100 (C- or better); one of Sociology 53.100, Anthropology 54.100, or Sociology-Anthropology 56.100.
2. Sociology 53.255★ (Sociology of Deviance) and 53.271★ (Criminology, formerly 53.270)
3. Law 51.204 (Introduction to Criminal Law in Context)
4. Psychology 49.342★ (Criminal Behaviour)
5. Sociology 53.373★ (Criminal Justice Policy) or 53.388★ (Current Issues in Criminal Justice)
6. Sociology 53.386★ (Field Placement) or Psychology 49.393★ or 49.394★ (Practicum) or Law 51.395★ (Practicum)

Students must maintain a *minimum* average of C- (4.0) in requirements 2 to 5 listed above, in order to remain in, and graduate with, the concentration in Criminology and Criminal Justice.

The Field Placement or Practicum is graded "Satisfactory" or "Unsatisfactory." To obtain credit for this course, a student must achieve the grade of "Satisfactory."

It should be noted that either Psychology 49.210★ or 49.260★ is a prerequisite for Psychology 49.342★, and that Sociology 53.255★, 53.271★ (formerly 53.270) and Third-year standing are prerequisites for Sociology 53.373★ and 53.388★. The prerequisite for Law 51.204 is Law 51.100 with the grade of C- or better.

Disciplinary Requirements

Pass Degree

In addition to the concentration requirements, students must also complete compulsory disciplinary requirements. These are found on the chart that follows.

Students in the Criminology and Criminal Justice concentration must select a program from one of the six combinations given below:

1. Major in Law
2. Major in Sociology-Anthropology
3. Major in Psychology
4. Combined Major in Sociology-Anthropology and Psychology
5. Combined Major in Sociology-Anthropology and Law
6. Combined Major in Psychology and Law

Honours Degree

Students interested in an Honours degree in Law, Sociology or Psychology, or a Combined Honours degree in two of Law, Psychology or Sociology, with the concentration in Criminology and Criminal Justice must:

1. fulfil the disciplinary requirements for the Honours degree;
2. fulfil the concentration requirements in Criminology and Criminal Justice; and
3. in fulfilling the disciplinary requirements for the Honours degree, complete a thesis pertaining to the legal, psychological or sociological analysis of crime or criminal justice.

For further information consult the program co-ordinator and the Honours adviser in the relevant discipline.

Related Options

There are a number of courses relevant to the area of Criminology and Criminal Justice, which students may consider as options. Such courses are:

Sociology 53.256★, Police in Society
Psychology 49.343★, Addiction
Psychology 49.364★, Abnormal Psychology

Field Placement (or Practicum)

Students may complete either Sociology 53.386★ or Psychology 49.393★ or 49.394★ or Law 51.395★ as part of their concentration requirements. The courses are open only to Third-year students admitted to the concentration.

Disciplinary Requirements for Pass Degree

Requirements for a Major in Sociology-Anthropology

1. One chosen from 53.100, 54.100, 56.100;
2. 53.203 or 54.203
3. One chosen from 56.305, 53.306, 54.310;
4. One additional credit in Sociology and/or Anthropology at the 300 level (53.373★ or 53.388★, and 53.386★);
5. Two additional credits in Sociology and/or Anthropology beyond the 100 level (53.255★ and 53.271★).

Requirements for a Major in Law

1. Law 51.100 (C- or better);
2. Two of Law 51.203, 51.204 or 51.205 (51.204);
3. At least three additional Law credits (51.395★).

Requirements for a Major in Psychology

1. 49.100;
2. 49.200;
3. Four of 49.210★, 49.220★, 49.230★, 49.250★, 49.260★, and 49.270★; to include at least one of 49.220★ or 49.270★;
4. Two additional credits in Psychology (including 49.342★ and 49.393★ or 49.394★);
5. Two credits outside the Faculty of Social Sciences. (These must each be from a different department or interdisciplinary area.)

Requirements for Combined Major in Sociology-Anthropology/Law Sociology-Anthropology/Psychology and Psychology/Law

Sociology-Anthropology

1. One chosen from 53.100, 54.100, 56.100;
2. Either one of 53.203, 54.203, or one chosen from 56.305, 53.306, 54.310;
3. One additional credit in Sociology and/or Anthropology at the 300 level (53.373★ or 53.388★, and 53.386★);
4. One further credit in Sociology and/or Anthropology beyond the 100 level (53.255★ and 53.271★).

Psychology

1. 49.100;
2. 49.200;
3. Four of 49.210★, 49.220★, 49.230★, 49.250★, 49.260★, and 49.270★; to include at least one of 49.220★ or 49.270★;
4. One additional credit in Psychology (49.342★ and 49.393★ or 49.394★);
5. Two credits outside the Faculty of Social Sciences. (These must each be from a different department or interdisciplinary area.)

Law

1. Law 51.100 (C- or better);
2. Two of Law 51.203, 51.204 or 51.205 (51.204);
3. At least two further Law credits (51.395★).

Note:

Where concentration requirements also fulfil disciplinary requirements, the courses are listed in parentheses.

Dunton Tower, Room 2115
Telephone: 788-2368

Members of the Committee

Program Co-ordinator
Al Riding (*School of Business*)

Members

C. Dence (*Registrar, Faculties of Art and Social Sciences, ex officio*)
P. Findlay (*Social Work*)
M. Fox (*Geography*)
C. Gordon (*Sociology and Anthropology/Architecture*)
J. Lambert (*Biology*)
J.H. Taylor (*History*)

General Information

In Directed Interdisciplinary Studies, students concentrate on a theme or field of interest outside the formal programs offered by departments, schools or institutes. Students may choose courses from various disciplines bearing directly upon their interests. Some possibilities are medieval studies, Renaissance studies, Third World studies, African studies, Asian studies, comparative literary studies, studies in the fine arts, labour studies, urban studies, women's studies, technology, society and environment studies, or studies leading to a specific vocational goal not met by existing programs. Please refer to the Interdisciplinary section of the Calendar, p. 416, for listings of courses and committees in some of these fields. Students in Directed Interdisciplinary Studies may take either a Pass or an Honours program.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all Committee regulations and requirements as set out below.

Pass Program

1. Students applying for admission to the Pass program must complete the prescribed application form, available from the office of Directed Interdisciplinary Studies, 2115 Dunton Tower. They are required to list and justify a minimum of eight credits related to a significant theme or field of interest and fitting into a coherent pattern. On acceptance of the application, the credits noted above, or any variation later agreed to by the Committee, become a requirement for completion of the degree.

2. Prior to submitting a formal application, students are advised to consult with the Program Co-ordinator for assistance in working out a suitable pattern of courses.

3. To allow time for adequate appraisal by the Committee, the application for admission should be submitted as early as possible before the year of entry to the program (by July 1 for September registration and by November 1 for January registration).

4. Students may apply for admission to the program at any time after completion of their first five credits and before they begin their last five credits towards the degree.

5. Normally, three credits in the student's field of interest are to be included among the last five credits taken towards the degree.

6. In order to graduate, students must have a minimum overall grade-point average of 4.0 (C-) in all 15 credits counted towards the degree, as well as a minimum grade-point average of 4.0 (C-) in the eight-credit pattern approved for the degree.

7. Students must obtain at least one credit at the 300 level or above.

Honours Program

1. Students applying for admission to the Honours program must complete the prescribed application form, available from the office of Directed Interdisciplinary Studies, 2115 Dunton Tower. They are required to list and justify a minimum of 12 credits related to a significant theme or field of interest and fitting into a coherent pattern. On acceptance of the application, the credits noted, or any variation later agreed to by the Committee, become a requirement for completion of the degree.

2. At least six of the 20 credits must be in a single discipline.

3. At least four of the 12 credits should be taken at the 400 level or equivalent, one of these to be the Honours Essay, Interdisciplinary 04.498.

4. Regulations for the Major program numbered 2, 3, 4 and 5 apply equally to Honours.

Course Offered

Interdisciplinary 04.498

Honours Essay

A required interdisciplinary research essay for Honours students in the Fourth year of Directed Interdisciplinary Studies. The project is carried out by the student in consultation with a faculty supervisor. The project must be approved in advance by the Committee on Directed Interdisciplinary Studies; students must consult with the Program Co-ordinator in selecting a project and a supervisor. At least one week before the last day for course changes, students must submit to the Program Co-ordinator a written outline of the proposed study, approved by the supervisor. Arts and Social Sciences regulations governing Honours Theses and Research Essays apply to this project, which is equivalent to one credit. Registration in this course is limited to students in the Fourth year of the B.A. (D.I.S.) Honours program.

Loeb Building, Room C876
Telephone: 788-3744

Officers of Instruction

Chairman
E.U. Choudhri

Supervisors of Graduate Studies
Ph.D. Studies, to be announced
P.N. Rowe, M.A. Studies

Supervisor of Honours Studies
To be announced

Supervisor of Pass Studies
R.R. Geehan

Professors
A.K. Acheson
J.I. Bernstein
R.A. Brecher
E.U. Choudhri
H.E. English
W.I. Gillespie
K.A.J. Hay
N.H. Lithwick (*Joint Appointment, School of Public Administration*)
K. Marwah
C.J. Maule
D.G. McFetridge
C.H. McMillan
S.B. Park
T.K. Rymes
E.G. West

Associate Professors
R.L. Carson
E.G. Davis
J.S. Ferris
R.R. Geehan
C.L. Johnson
J.C. McManus
R.F. Neill
A.R.M. Ritter (*Joint appointment, School of International Affairs*)
T.W. Ross
D.A. Smith

Assistant Professors
D.W. Allen
C.M. Carmichael
F.S. Demers
M. Demers
C. Gilles
S. Power
P.N. Rowe
H. Schaller
L.L. Schembri

Director of Doctoral Studies, Joint Ph.D Program with the University of Ottawa
To be announced

Departmental Administrator
Judy Poole

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Mathematics Requirements

Students intending to pursue courses in Economics beyond the introductory level are strongly advised to take Mathematics 69.007★ if they lack an OAC in Calculus, and 69.017★ if they lack an OAC in Algebra and Geometry.

Pass Programs

Pass Program in Economics

Students are normally permitted to major in Economics only if they have obtained a grade of at least C- in Economics 43.100. The requirement for a Pass degree is Mathematics 69.109★ and 69.119★ and at least six credits in Economics: Economics 43.100, 43.202★, 43.203★, 43.212★, 43.213★, 43.220, one 400-level credit, and one other credit at the 200, 300 or 400 level. The student's program for the Second and Third years must be approved by the Supervisor of Pass Studies for the Department.

A Pass student must maintain a minimum grade-point average of 4.0 (C-) to remain in the program. For purposes of determining a Pass student's average at graduation, only the six required credits in Economics (i.e. excluding 69.109★ and 69.119★) will be considered.

Combined Pass Program

Students in Combined Pass programs will complete Mathematics 69.109★ and 69.119★ and five credits in Economics: Economics 43.100, 43.202★, 43.203★, 43.212★, 43.213★, one 400-level credit in Economics and one other Economics credit chosen in consultation with the Supervisor of Pass Studies. Students in the Combined Pass program must maintain a minimum grade point average of 4.0 (C-) to remain in the program.

Honours Programs

The Honours programs may be entered in First year or by transfer from the Pass programs if minimum Honours standing has been obtained. The student's program for the Second and subsequent years must be planned in consultation with the Supervisor of Honours Studies of the Department.

Honours in Economics

The requirement for an Honours degree is a minimum of 20 credits with at least nine credits in Economics and one credit in Mathematics. The Honours requirements include: Mathematics 69.109★ and 69.119★ or equivalent; Economics 43.100, 43.202★, 43.203★, 43.212★, 43.213★, 43.220, 43.240★, 43.420★, 43.421★, 43.476★, 43.490, plus two additional credits in Economics at the 400 level.

An Honours Essay (Economics 43.498) with a minimum grade of *B-* may be written to earn one credit at the 400 level, and can replace the Economics 43.490 requirement. Students who choose to do the Honours Essay must have a detailed outline of the Essay approved by their adviser and by the Honours Supervisor before the last day for withdrawal from full-credit courses. In the absence of such an approved outline, the Department may require the student to withdraw from the Honours Essay.

For purposes of determining an Honours student's standing at graduation, only required credits in Economics (i.e. excluding Mathematics 69.109★ and 69.119★) will be considered. If a student has taken more than the minimum number of 20 credits, the lowest grades among optional credits taken over the minimum will be disregarded in computing final standing.

Normal Course Pattern in Honours Economics

First year: Economics 43.100, Mathematics 69.109★ and 69.119★.

Second year: Economics 43.202★, 43.203★, 43.212★, 43.213★, 43.220, 43.240★.

Third year: Economics 43.420★ and 43.421★, 43.476★, one-half additional Economics credit at the 400 level.

Fourth year: Economics 43.490, one and a half Economics credits at the 400 level.

Other course patterns may be arranged after consultation with the Supervisor of Honours Studies.

Combined Honours

Students may apply for Combined Honours in Economics and another discipline. Students should consult the Supervisor of Honours Studies.

Students in the Combined Honours program are normally required to take one credit in Mathematics and at least seven credits in Economics, of which three credits are at the 400 level. The requirements are: Mathematics 69.109★ and 69.119★ or equivalent; Economics 43.100, 43.202★, 43.203★, 43.212★, 43.213★, 43.220, 43.240★, 43.420★, 43.421★, 43.490, and an additional half credit at the 400 level. The Honours Essay (Economics 43.498) with a weight of one credit, requiring a minimum grade of *B-*, may be written in Economics and can replace the Economics 43.490 requirement.

The minimum of 20 credits and the procedure for computing final standing described above apply to the Combined Honours program.

The Combined Honours programs in four related fields are described in greater detail below.

Normal Course Pattern in Combined Honours in Economics

First year: Economics 43.100; Mathematics 69.109★ and 69.119★.

Second year: Economics 43.202★, 43.203★, 43.212★, 43.213★, 43.220 (or recognized equivalent), 43.240★.

Third year: Economics 43.420★ and 43.421★.

Fourth year: Economics 43.490 and one additional half credit in Economics at the 400 level.

Other course patterns may be arranged after consultation with the Supervisor of Honours Studies.

Combined Honours in Economics and Political Science

Students intending to follow this program should take Mathematics 69.109★ and 69.119★ and Economics 43.100 or Political Science 47.100 (or preferably both) in the First year. The choice of courses in subsequent years will be subject to the approval of the two departments. The Honours requirements include at least an additional six credits in Economics and six credits in Political Science, one of which must be Political Science 47.498 or Economics 43.498 to be taken in the student's final year. These will be arranged so that students may transfer either to full Honours in Political Science or to full Honours in Economics at the end of the Third year if they then wish to specialize more intensively. Students must also meet the language requirements of the Department of Political Science. Economics 43.240★, 43.420★ and 43.421★ are required.

Combined Honours in Economics and Mathematics

The Economics requirements are: Economics 43.100, 43.202★, 43.203★, 43.212★, 43.213★, either 43.220 or Mathematics 69.257★ and 69.259★, Economics 43.420★, 43.421★, 43.490, one half credit at the 300 level or above, and one credit at the 400 level. Students in Combined Honours in Economics and Mathematics are not required to take Economics 43.240★. The Mathematics requirements of the program are considered to provide more than equivalent material.

The Mathematics requirements are: Mathematics 69.102, 69.112 (or their equivalents), either Mathematics 69.257★ and 69.259★ or Economics 43.220, Mathematics 70.200, 70.210, 70.260, 70.301★, 70.350, at least one of 70.302★ or 70.308★, one half credit at the 300 level or above, and one credit at the 400 level.

Combined Honours in Economics and Journalism

Students in this program are required to complete a total of 20.5 credits and may choose to graduate with either a B.A. (Honours) or B.J. (Honours).

The Economics requirements are: Mathematics 69.109★ and 69.119★, Economics 43.100, 43.202★, 43.203★, 43.212★, 43.213★, 43.220, 43.240★, 43.420★, 43.421★, 43.490; an approved credit in economic history and a half-credit option in Economics at the 400 level. The Journalism requirements are: a language course, preferably French, (acceptable 100-level French courses are any two of French 20.102★, 20.103★, and 20.104★; 20.108; and 20.110). Journalism 28.100, 28.200, 28.220, 28.320, 28.351★, 28.421, 28.498.

Note:

Journalism 28.320 is a two-credit course.

Combined Honours in Economics and Sociology

The Economics requirements are: Mathematics 69.109★ and 69.119★, Economics 43.100, 43.202★, 43.203★, 43.212★, 43.213★, 43.220 (or Sociology 53.370), 43.240★, 43.420★, 43.421★, 43.490 and an additional half credit at the 400 level.

See also p. 239 and consult the Department of Sociology and Anthropology.

Graduate Program

The Department of Economics offers studies leading to the degree of Master of Arts and to the degree of Doctor of Philosophy. For further details consult the Graduate Studies and Research Calendar.

Courses Offered

Note:

Not all of the courses listed below can be made available each year in the Fall and Winter terms. Students are advised to consult with the department prior to registration to ascertain those courses offered in 1990-91.

Economics 43.100**Introduction to Economics**

An introduction to the major tools and policy problems of economics. Economic analysis is applied to a variety of contemporary problems such as pollution, poverty, the control of monopoly, unemployment, inflation and international economic problems.

Day and Evening divisions: Lectures three hours a week. Discussion groups (one hour) may be arranged.

Economics 43.201★**Introduction to Microeconomic Theory and Analysis**

The main topics in microeconomic theory with illustrations of their applications. Not open to students in Economics or Business.

Credit will not be given for both Economics 43.201★ and either of 43.202★ or 43.203★.

Prerequisite: Economics 43.100 or permission of the Department.

Lectures and discussions three hours a week.

Economics 43.202★**Intermediate Microeconomics I**

An analysis of consumer demand, production, costs and an introduction to market structures, with special reference to the determination of conditions which maximize social welfare.

Credit will not be given for both Economics 43.201★ and 43.202★.

Prerequisites: Economics 43.100 (grade of C– or better) and Mathematics 69.109★, which may be taken concurrently with Economics 43.202★.

Day and Evening divisions: Lectures three hours a week.

Economics 43.203★**Intermediate Microeconomics II**

An analysis of distribution, market structures and general equilibrium theory, with special reference to the determination of conditions that maximize social welfare.

Credit will not be given for both Economics 43.201★ and 43.203★.

Prerequisite: Economics 43.202★.

Day and Evening divisions: Lectures three hours a week.

Economics 43.211★**Introduction to Macroeconomic Theory and Analysis**

The main topics in macroeconomic theory with illustrations of their application. Not open to students in Economics or Business.

Credit will not be given for both Economics 43.211★ and either of 43.212★ or 43.213★.

Prerequisite: Economics 43.100 or permission of the

Department.

Lectures and discussions three hours a week.

Economics 43.212★**Intermediate Macroeconomics I**

An examination of the standard macroeconomic model of a closed economy, emphasizing both the aggregate demand and the aggregate supply side of the economy. The model is used to analyze basic macroeconomic problems and evaluate proposed solutions of these problems.

Credit will not be given for both Economics 43.211★ and 43.212★.

Prerequisite: Economics 43.100 (grade of C– or better) and Mathematics 69.109★, which may be taken concurrently with Economics 43.212★.

Day and Evening divisions: Lectures three hours a week.

Economics 43.213★**Intermediate Macroeconomics II**

An extension of the standard macroeconomic model to include topics such as macroeconomic theory and policy in an open economy, theoretical development and empirical analysis of basic macro relationships, the short-run dynamics of wage-price adjustment and economic growth. Credit will not be given for both Economics 43.211★ and 43.213★.

Prerequisite: Economics 43.212★

Day and Evening divisions: Lectures three hours a week.

Economics 43.220**Statistical Methods in the Social Sciences**

An introduction to statistical inference.

Precludes additional credit for Mathematics 69.250, 69.257★, 69.259★, 69.266★, 69.267★, Psychology 49.300, and Sociology 53.370.

Prerequisites: Mathematics 69.109★ and 69.119★ or equivalent and one of Economics 43.100 (grade of C– or better), Political Science 47.100 or Sociology 53.100, or permission of the Department.

Day and Evening divisions: Lectures three hours a week, laboratory two hours a week.

Economics 43.235**Canadian Economic History**

A historical survey of persistence and change in the Canadian economy from the eighteenth to the twentieth centuries. (Also listed as History 24.235.)

Prerequisite: Economics 43.100 or permission of the Department.

Economics 43.240★**Economic Applications of Mathematics**

Optimization, with and without constraints, and comparative static methods applied to models such as utility maximization and least cost production; homogenous functions; compounding and exponential functions; economic models involving integration; the use of matrix algebra and differential equations.

Prerequisites: Economics 43.100 and Mathematics 69.109★ and 69.119★.

Economics 43.250★**Introduction to Business Finance**

A study of business firms' financing and dividend policy decisions, cost of capital and short-term asset management problems. (Also listed as Business 42.250★.)

Prerequisites: Economics 43.100, Business 42.100 (or 42.101★ and 42.102★) and Mathematics 69.109★ and 69.119★ or equivalent (a grade of C– or better in all of these courses).

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week.

Economics 43.305★

Selected Topics in Economic History

Examination of the economic development of North America or Europe or other possible selected sets of countries. Countries examined vary from year to year. Prerequisite: Economics 43.100 or permission of the Department.
Not offered 1990-91.

Economics 43.320★

Economics of Information and the Media

An introduction to the economics of information and the media, with a focus on the analysis of production and distribution of information, the application of theory to selected communications-media industries in Canada, and the analysis of existing Canadian policies. Prerequisite: Economics 43.100.
Not offered 1990-91.

Economics 43.324★

An Economic Analysis of Law

An introduction to the application of economic principles and methodology to a variety of legal problems with particular emphasis on the theory of property rights and the allocation of resources. Prerequisite: Economics 43.100.
Not offered 1990-91.

Economics 43.325

The Economic Development of Canada

A general survey of Canadian economic development from 1534 to 1970. Prerequisite: Economics 43.100 or permission of the Department.
Lectures three hours a week.

Economics 43.326★

Economic Theories of Federalism

An introduction to the economic dimensions of federalism, with particular reference to Canadian experience. The issues to be covered include: fiscal federalism; the impact of federal economic policies on provincial economies; the consequences of province-serving policies (trade barriers, impediments to factor flows, etc.) for national economic performance; decentralization possibilities for fiscal and economic development policies. Analytical tools to be developed include interregional trade models, interregional input-output analysis and interregional balance of payments models. Prerequisite: Economics 43.100. Students are encouraged to take Political Science 47.301★ to obtain an appreciation of the political dimension of many of these issues.
Not offered 1990-91.

Economics 43.331★

Social Economics

An examination of some of the ways in which public authorities attempt to reshape the economic environment towards a greater conformity to social values. The objectives and practice of social security schemes, housing policy, "the war on poverty," etc., are considered. Prerequisite: Economics 43.100.
Not offered 1990-91.

Economics 43.335

Political Economy in the Modern State

An examination of the role of government in the economy, with special emphasis on alternate forms of social co-or-

dination and the advantages and disadvantages of each form in the Canadian system. Prerequisite: Economics 43.100.
Lectures two hours a week.

Economics 43.341★

Regional Economics

An examination of the issue of unequal distribution of economic activity between spatially defined regions. Emphasis is placed on an evaluation of the current pattern in Canada since World War II, considering "natural" adjustment mechanisms, policy tools that have been developed, and the outlook for the future. Lessons are drawn from empirical and theoretical studies of the issue on other economies. Prerequisite: Economics 43.100.
Lectures three hours a week.

Economics 43.342★

Special Studies in Economics

Content of this course varies year by year, topics to be determined by the instructor invited to offer the course. Prerequisite: Economics 43.100.

Economics 43.344★

Economic Thought and Policy in Canada

An account of the interrelationship between economic theories expounded in Canada and their issue in national policy. Prerequisite: An introductory course in one of the social sciences or Canadian history.
Not offered 1990-91.

Economics 43.346★

Agricultural Economics

An examination of the agricultural industry in the national economy and in low-income societies. The course emphasizes the working out of the basic forces that determine supply-demand for the industry and the functional distribution of income among the factors of production. The place of institutions is examined and public policy is critically reviewed. Prerequisite: Economics 43.100.
Not offered 1990-91.

Economics 43.347★

Public Finance: Taxation

The role and nature of the government sector in the economy, the principles of taxation, tax equity, the incidence and excess burden of taxes, the structure of taxes in the Canadian economy, the role of personal, corporate, sales and wealth taxes in the economy, fiscal stabilization policy, and the economics of public debt. Precludes additional credit for Economics 43.303★ (no longer offered) and 43.441★.
Prerequisite: Economics 43.100.

Economics 43.348★

Public Finance: Expenditure

The role and nature of the government sector in the economy, the theory of public goods, the equity and efficiency effects of public expenditures, voting rules and fiscal politics, techniques of public expenditure analysis, and intergovernmental fiscal relations. Precludes additional credit for Economics 43.303★ (no longer offered) and 43.442★.
Prerequisite: Economics 43.100.

Economics 43.350★**Corporate Finance**

An examination of the major issues in corporate finance and applied financial management. Topics include: introduction to portfolio theory, the capital asset pricing model, cost of capital, capital structure and dividend policy, lease financing, capital budgeting under uncertainty, mergers and consolidations. (Also listed as Business 42.350★.)

Prerequisites: Economics 43.202★, 43.250★, and 43.220 or Mathematics 69.267★.

Day division, Fall and Winter terms: Lectures two hours a week.

Economics 43.351★**Principles of Investments**

Procedures and methods of investment analysis. The stock and bond markets. Government regulation of securities markets. Valuation of common stocks and fixed income securities. Options, warrants, convertibles and commodities. (Also listed as Business 42.352★.)

Prerequisites: Economics 43.250★, and 43.220 or Mathematics 69.267★.

Day division, Fall and Winter terms: Lectures two hours a week.

Economics 43.356★**Introduction to Labour Economics**

An introduction to the basic principles of labour economics. Topics covered include: labour markets, the supply of labour, the demand for labour, labour mobility and migration, wage structures, the logic of trade union action, economics of trade unions, the impact of trade unions and selected macroeconomic aspects of the labour market.

Prerequisite: Economics 43.100.

Economics 43.357★**Introduction to Industrial Relations**

An introduction to industrial relations covering such topics as: industrial relations systems, the functioning of trade unions, collective bargaining in Canada and Canadian public policy in industrial relations. (Also listed as Business 42.317★.)

Prerequisite: Economics 43.100.

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week.

Economics 43.360★**Topics in International Economics**

Special topics in international trade are examined. Among possible areas to be considered are theory and policy in international trade, finance, investment and development. Intended for students planning to take only one half credit in international economics at the 300 level. More comprehensive coverage of international economics may be achieved by taking both Economics 43.361★ and 43.362★. Precludes additional credit for Economics 43.361★ and 43.362★.

Prerequisite: Economics 43.100 or permission of the Department.

Lectures three hours a week.

Economics 43.361★**Introduction to International Trade**

An extension of the basic principles of economics to international trade. Topics covered include the theory of international specialization, tariffs and other barriers to trade, trade liberalization and economic integration, international movements of labour and capital, trade and development. Precludes additional credit for Economics 43.360★ and 43.461★.

Prerequisite: Economics 43.100.

Lectures three hours a week.

Economics 43.362★**International Monetary Problems**

A discussion of the theory and institutions of the international monetary system, and the related balance of payments problems of nation states.

Precludes additional credit for Economics 43.360★ and 43.462★.

Prerequisite: Economics 43.100.

Lectures three hours a week.

Economics 43.363★**Introduction to Economic Development**

A discussion of the principles of economic development. Application to the problems of the developing countries.

Prerequisite: Economics 43.100.

Lectures three hours a week.

Economics 43.365★**The Economics of Planning**

This course considers several aspects of the economics of planning.

Prerequisite: Economics 43.100.

Not offered 1990-91.

Economics 43.371★**Socialist Economic Systems: The Soviet Model**

This course examines Soviet socialism in its historical development and current practice. Topics include: Soviet industrialization, central planning, collectivization of agriculture, foreign economic relations and recent trends in the Soviet economy. The Soviet economy is studied in the context of comparative economic systems.

Prerequisite: Economics 43.100.

Lectures and discussions three hours a week.

Economics 43.372★**Socialist Economic Systems: Eastern European Variants**

This course examines the two major Eastern European variants of the traditional model of a centrally planned, socialist economy. Hungary's "New Economic Mechanism" and Yugoslavia's "Self-Managed Economy" are studied in the context of economic reform in Eastern Europe.

Prerequisite: Economics 43.100.

Economics 43.380★**Topics in Canadian Economic Policy**

Economic analysis applied to selected policy areas, issues or institutions. One or more of the following topics may be dealt with: decision-making by bureaucratic institutions, policy problems arising from poverty, the economics of natural resources and pollution, urban economics.

Prerequisite: Economics 43.100.

Not offered 1990-91.

Economics 43.385★**The Economics of Natural Resources**

This course is concerned with the application of economic analysis to questions concerning natural-resource use, management and conservation, as well as market failures and environmental effects. Policy problems relating to natural resources are discussed.

Prerequisite: Economics 43.100.

Lectures three hours a week.

Economics 43.404★

Operations Research I

Linear programming, networks, and such techniques as PERT (Program Evaluation and Review Technique) and CPM (Critical Path Method).

Precludes additional credit for Business 42.230★ and Mathematics 69.381★.

Prerequisites: Mathematics 69.109★ and 69.119★ (grade of C– or better).

Lectures three hours a week.

Economics 43.405★

Operations Research II

Dynamic programming, inventory models, queuing, simulation, non-linear programming. (Also listed as Business 42.435★.)

Prerequisites: Business 42.230★ or Economics 43.404★, or Mathematics 69.381★, and Economics 43.220 (grade of C– or better) or Mathematics 69.267★ (grade of C– or better).

Lectures three hours a week.

Economics 43.406★

Economics of Uncertainty and Information

An exploration of how uncertainty, imperfect information and asymmetric information affect the allocation of resources and the performance of markets and alternative co-ordinating mechanisms. (See also Business 42.439.)

Prerequisites: Economics 43.220 or Mathematics 69.266★ and 69.267★, and Economics 43.202★, with a minimum grade point average of 4.0 (C–) on these prerequisites.

Economics 43.407★

Statistical Decision Theory

An examination of Bayesian and classical approaches to decision-making under uncertainty for individuals and firms. (See also Business 42.439.)

Prerequisite: Economics 43.220 or Mathematics 69.266★ and 69.267★ (grade of C– or better).

Students are advised that it is preferable to take Economics 43.406★ prior to 43.407★.

Economics 43.408★

Advanced Corporate Finance

An in-depth examination of some of the major theoretical issues in corporate finance. This course requires analyses and presentations of both articles from the finance literature and case studies. (Also listed as Business 42.450★.)

Prerequisite: Economics 43.350★ (grade of C– or better).

Day division, Winter term: Lectures two hours a week.

Economics 43.410★

Finance and Capital Markets

The workings and structure of Canada's capital markets with particular reference to differing classes of institutional lenders and borrowers; relationships of non-bank financial intermediaries to the banking system, regulatory agencies and the public, the impact of these institutions on corporate financial and national economic policy, access to foreign capital markets and external financing of Canadian economic development. (Also listed as Business 42.453★.)

Prerequisites: Economics 43.202★, 43.203★, 43.212★, 43.213★ and 43.220. Mathematics 69.267★ may be substituted for 43.220 (grade of C– or better in each).

Day division, Fall and Winter terms: Lectures and seminars three hours a week.

Economics 43.411★

Investment Management

Analysis of investment requirements for individuals and institutional investors: liquidity, risk and return; portfolio

design, construction, management and control; performance measurement; capital market theory. (Also listed as Business 42.452★.)

Prerequisite: Economics 43.351★ (grade of C– or better).

Day division, Winter term: Lectures and seminars two hours a week.

Economics 43.415

History of Economic Thought

The crucial achievements in economic theory and doctrine in the nineteenth and twentieth centuries are studied. Special emphasis is given to the interrelationship between the social environment and economic thought, especially to the role of economics in the development of the national state and international institutions.

Prerequisite: One of Economics 43.202★ and 43.203★, 43.201★, 43.212★ and 43.213★, or 43.211★, with an average grade of C– or better, or permission of the Department.

Lectures and seminars three hours a week.

Economics 43.420★

Microeconomic Theory

Theory of individual economic behaviour, theory of exchange and production, general equilibrium, alternative theories of pricing, allocation and distribution. Elementary tools of mathematics are employed in the exposition of most topics.

Prerequisites: Economics 43.202★ and 43.203★, with an average grade of C+ or better, 43.220 and 43.240★ (43.220 and 43.240★ may be taken concurrently with 43.420★).

This course is required for students in the Honours program in Economics.

Lectures three hours a week.

Economics 43.421★

Macroeconomic Theory

Macroeconomic theory and its implications for economic policy are examined in this course. Emphasis is placed on major controversies in the field, with consideration given to topics such as: determination of national income, employment, price level and interest rates; commodity, labour and asset market behaviour; and fiscal and monetary management for economic stabilization. Elementary tools of mathematics are employed in the exposition of most topics.

Prerequisites: Economics 43.212★ and 43.213★, with an average grade of C+ or better, 43.220 and 43.240★ (43.220 and 43.240★ may be taken concurrently with 43.421★).

This course is required for students in the Honours program in Economics.

Lectures three hours a week.

Economics 43.426★

Topics in North American Economic History

An examination of methodology applicable to the analysis of economic history. Intensive examination of selected topics in North American economic history.

Prerequisites: Economics 43.202★, 43.203★, 43.212★ and 43.213★, with an average grade of C– or better on these prerequisites, or permission of the Department.

Not offered 1990-91.

Economics 43.427★

Topics in European Economic History

An examination of methodology applicable to the analysis of economic history. Intensive examination of selected topics in European economic history.

Prerequisites: Economics 43.202★, 43.203★, 43.212★ and 43.213★, with an average grade of C– or better on these prerequisites, or permission of the Department.

Not offered 1990-91.

Economics 43.430**Industrial Organization and Public Policy**

An analysis of the organization of Canadian industry, with reference to associated U.S. industry where necessary. A few representative industries are examined in some detail. Price theory is used to distinguish economic from institutional factors affecting the structure of the economy. Emphasis is placed upon public policies that affect, intentionally or otherwise, the organization and behaviour of industry, e.g., public utility regulation, control of restrictive practices, commercial policy and price supports.

Prerequisites: Economics 43.202★ and 43.203★, or 43.201★, with an average grade of C– or better on these prerequisites.

Lectures and seminars three hours a week.

Economics 43.435**Manpower Economics and Labour Policy**

A discussion of topics in labour economics with emphasis on the Canadian economy. Price theory is applied to the labour market. Emphasis is placed upon public policies that affect the organization and performance of labour, e.g. equal pay legislation. Topics of current interest are examined in light of recent research findings.

Prerequisites: Economics 43.202★ and 43.203★, or 43.201★, with an average grade of C– or better on these prerequisites.

Lectures three hours a week.

Economics 43.439★**Industrial Economics**

This course examines the empirical application of microeconomics, with special emphasis on the Canadian economy. Topics include: consumer demand, firm production and investment, and industrial and trade structure.

Prerequisites: Economics 43.202★, 43.203★, and 43.220, with a *minimum* grade point average of 4.0 (C–) on these prerequisites.

Economics 43.441★**Public Finance: Taxation**

A discussion of the theory of taxation and an examination of empirical attempts to quantify the theory. Some topics of current interest, such as the redistribution of income in Canada and tax reform are examined.

Precludes additional credit for Economics 43.347★.

Prerequisites: Economics 43.202★ and 43.203★, or 43.201★, with an average grade of C– or better on these prerequisites.

Lectures three hours a week.

Economics 43.442★**Public Finance: Expenditures**

A discussion of the theory of government expenditures and an examination of empirical attempts to quantify the theory. Some topics of current interest, such as expenditures and grants in the Canadian federalism are examined.

Precludes additional credit for Economics 43.348★.

Prerequisites: Economics 43.202★ and 43.203★, or 43.201★, with an average grade of C– or better on these prerequisites.

Lectures three hours a week.

Economics 43.445★**Welfare Economics**

An examination of contemporary welfare economics and its applications.

Prerequisites: Economics 43.202★ and 43.203★, or 43.201★, with an average grade of C– or better on these prerequisites.

Economics 43.446★**Economic Dynamics: Growth**

An examination of modern steady equilibrium economic growth encompassing neoclassical, neo-Keynesian and neo-Ricardian theories of growth and accumulation. The theories of money and capital (and controversies) are examined in a growth context. Some discussion of optimum saving and accumulation is also included.

Prerequisites: Economics 43.202★, 43.203★, 43.212★ and 43.213★, with an average grade of C– or better on these prerequisites.

Lectures and seminars three hours a week.

Economics 43.451★**Economic Dynamics: Business Cycles**

An analysis of the nature and causes of fluctuations in income, prices and employment. A review of theories of short-run economic dynamics, with particular references to how expectations are formed. Some consideration is given to countercyclical government policies.

Prerequisites: Economics 43.212★ and 43.213★, with an average grade of C– or better on these prerequisites.

Not offered 1990-91.

Economics 43.457★**The Economics of Development**

An examination of some theoretical approaches to the economics of development, together with analysis of some economic policy issues of a largely internal character, such as intersectoral investment allocation, income distribution, unemployment, and investment in human development.

Prerequisites: Economics 43.202★ and 43.203★, or 43.201★; and 43.212★ and 43.213★, or 43.211★, with an average grade of C– or better on these prerequisites.

Lectures three hours a week.

Economics 43.458★**International Aspects of Economic Development**

An analysis of the international economic policy problems of development in Asia, Africa and Latin America, focusing on international trade, direct foreign investment, technological transfer, regional integration, debt and development financing, and international migration.

Prerequisites: Economics 43.202★ and 43.203★, or 43.201★; and 43.212★ and 43.213★, or 43.211★, with an average grade of C– or better on these prerequisites.

Lectures three hours a week.

Economics 43.461★**International Trade Theory and Policy**

International trade theory and its implications for economic policy. Topics such as determinants of trade and specialization, gains from trade and commercial policy, international factor mobility, growth and development.

Precludes additional credit for Economics 43.361★.

Prerequisites: Economics 43.202★ and 43.203★, or 43.201★, with an average grade of C– or better on these prerequisites.

Lectures three hours a week.

Economics 43.462★**International Monetary Theory and Policy**

International monetary theory and its implications for economic policy. Topics such as sources of disequilibrium and adjustment in the balance of payments under fixed versus flexible exchange rates, international capital movements, and international monetary reform.

Precludes additional credit for Economics 43.362★.

Prerequisites: Economics 43.212★ and 43.213★, or 43.211★, with an average grade of C– or better on these

prerequisites.

Lectures three hours a week.

Economics 43.465 Industrial Relations

An examination of various theories concerning industrial relations systems, human resource utilization and organizational maintenance and stress. Application of the core analytical disciplines (political science and economics) to the study of conflict resolution among management, workers and governments in the pluralistic environment of the firm. The operationality and policy significance of a number of royal commission reports and studies are examined in the light of these various theories of industrial and human relations.

Prerequisites: Economics 43.202★ and 43.203★, or 43.201★, with an average grade of C– or better, and 43.357★.

Lectures three hours a week.

Economics 43.467★ Monetary Theory I

This course is designed to provide the analytical tools used in discussions of monetary theory and policy. The foundations of monetary theory are emphasized as are the effects of monetary change on economic activity coming through classical, Keynesian and other modern money transmission mechanisms. The policy implications of the "optimum quantity of money," various estimates of the money supply and demand, difficulties of implementing policy in open and closed economies and in a growth context are also examined.

Prerequisites: Economics 43.202★ and 43.203★, or 43.201★; and 43.212★ and 43.213★, or 43.211★, with an average grade of C– or better on these prerequisites.

Lectures three hours a week.

Economics 43.468★ Monetary Theory II

A continuation of Economics 43.467★. This course analyzes in depth some past and current controversies in monetary theory particularly as they relate to policy issues.

Prerequisite: Economics 43.467★.

Lectures three hours a week.

Economics 43.471★ National Accounting

An introduction to modern social accounting, including the national income and expenditure accounts, input-output accounts, financial flow and national balance sheet accounts. Emphasis is on Canadian practice with attention to new developments such as national wealth accounts, price and quantity index number theory and productivity measurement, inflation and its effects on the national accounts.

Prerequisites: Economics 43.202★, 43.203★, and 43.212★, with an average grade of C– or better on these prerequisites.

Economics 43.476★ Econometrics I

An introduction to econometric theory and analysis of the classical normal regression model. Topics include estimation methods, hypothesis testing, multicollinearity, autocorrelation, and heteroscedasticity.

Precludes additional credit for Economics 43.485 (no longer offered), 43.482★ (no longer offered), Mathematics 69.353★ and 70.355★.

Prerequisite: Economics 43.220 or equivalent, with a grade of C– or better.

Economics 43.477★ Econometrics II

An extension of Economics 43.476★, Econometrics I. Topics include dummy variables, qualitative and limited dependent variables, and simultaneous equation models. Optional topics include simple expectations models, errors in variables, specification tests and diagnostic checks, distributed lag models, and seemingly unrelated regression models.

Precludes additional credit for Economics 43.485 (no longer offered).

Prerequisite: Economics 43.476★, or Mathematics 69.353★ or 70.355★, with a grade of C– or better.

Economics 43.480

Research Seminar in Urban Economics

An enquiry into the internal dynamics of cities and inter-urban relationships primarily through directed research.

Prerequisites: Economics 43.202★ and 43.203★, or 43.201★; and 43.220 or Mathematics 69.266★ and 69.267★, with an average grade of C– or better on these prerequisites.

Not offered 1990-91.

Economics 43.483★

Applied Time Series Analysis in Economics and Business

An introduction to basic concepts of time series analysis with emphasis on model building and forecasts in economics and business. Topics include: models for stationary and nonstationary time series, model identification, estimation, computation of forecasts and transfer function models.

Prerequisites: Economics 43.220 or Mathematics 69.266★ and 69.267★, with an average grade of C– or better on these prerequisites.

Lectures three hours a week.

Economics 43.484★

Advanced Topics in Applied Econometrics

Advanced coverage of one or more areas of current interest in applied econometrics. An empirical research project may be required.

Prerequisites: Economics 43.476★ and 43.477★ with an average grade of C– or better on these prerequisites.

Economics 43.486★

Comparative Economic Systems I

This course builds a framework for the study and comparison of economic systems. Using basic economic tools, it discusses the properties and comparative advantages of different contemporary economies, as well as the forces that cause or prevent change. Some Marxian theory is included, along with analyses of the role of property rights, of incentives and motivation, and of the interaction between economic and political systems.

Prerequisite: Economics 43.201★ or 43.202★ with a grade of C– or better, or permission of the Department.

Economics 43.487★

Comparative Economic Systems II

A comparison of contemporary economic systems. Such diverse economies as Japan, West Germany, Sweden, the U.S.S.R., China, Cuba, Yugoslavia and Hungary may be explored.

Prerequisite: Economics 43.201★ or 43.202★ with a grade of C– or better, or permission of the Department.

Economics 43.490**Honours Seminar**

This seminar focuses on the use of basic economic analysis in a small number of research topics to be selected by the instructors. A major research paper is required. This seminar is open to Fourth-year Honours Economics students, or to others with permission of the Department.

Economics 43.493★**Tutorial in Economics**

An additional tutorial in Economics may be taken subsequent to, or concurrently with Economics 43.490.

Prerequisite: Permission of the Department.

Economics 43.494★**Tutorial in Economics**

An additional tutorial in Economics may be taken subsequent to or concurrently with Economics 43.490.

Prerequisite: Permission of the Department.

Economics 43.498 (1.0 credit)**Honours Essay**

Students taking Honours in Economics may write an Honours essay during their final year. This essay counts for one credit. Students work under an individual faculty adviser.

Prerequisite: Permission of the Department.

Courses Planned for Summer School and Evening Division

The Department attempts to offer the following courses each Summer: Economics 43.100, 43.202★, 43.203★, 43.212★, 43.213★. Each year, availability of instructors permitting, at least one half-credit course at the 300 level and a course at the 400 level will be offered. For Summer 1990 courses, see 1990 Summer Session Addendum.

The Department offers the following Evening courses each year: Economics 43.100, 43.202★, 43.203★, 43.212★, 43.213★, 43.220, plus a choice of optional courses that will vary from year to year depending upon projected enrolments and availability of instructors.

Dunton Tower, Room 1812
Telephone: 788-2310

Officers of Instruction

Chairman
R.G. Laird

Supervisor of Graduate Studies
M.J. Edwards

Pass and Honours Adviser
F.B. Gildenhuys

Professors Emeriti
A.M. Beattie
P. Crutwell
G.B. Johnston
R.L. McDougall

Professors
D.A. Beecher
V.K. Chari
M.J. Edwards
M. Gnarowski
C. Haines
J.J. Healy
B.W. Jones
R.H. MacDonald
A.T. Tolley
D.J. Wurtele

Associate Professors
M.I. Cameron
J.D. Campbell
H.P. Duchemin
B. Gabriel
B.C. Garner
F.B. Gildenhuys
M. Gunn
A.W. Heidemann
T.J. Henighan
R.L. Hogg
R.G. Laird
C. Levenson
R.B. Lovejoy
L.A. Mann
L.T.R. McDonald
A.D. McLay
T.G. Middlebro'
J.R. Morrison
J. Noonan
K. O'Donnell
E.D. Padolsky
R.B. Rutland
J.A. Steele
M.B. Thompson
A. Tilson
J.M. Wilcox

Assistant Professor
T.G. Nollet

Adjunct Professors
R.D. Mathews
K.J. McGillivray
G.J. Wood
L.D. Young

General Information

The Department of English Language and Literature introduced a revised program in 1983-84. Students who first registered in a Pass or Honours program in a session prior to 1983-84 may proceed under either the old or the new requirements. Students who first registered in a Pass or Honours program in 1983-84 or later must complete the new program requirements. Students in doubt about their status should consult the Registrar or the Pass and Honours Advisers in English.

Graduation Requirements

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Pass Program

The Pass program in English consists of a minimum of six credits in English, as follows:

1. A 100-level credit;
2. English 18.230;
3. A credit in Canadian literature;
4. One credit at the 300 level in British literature in the period prior to 1900
5. One additional credit at the 300 level;
6. One additional credit.

Note:

English 18.200★, 18.201★, 18.268, 18.291 and 18.293 may not be counted towards the Pass degree requirements but they may be counted as options towards the degree.

Combined Pass Program

A Combined Pass program in English and another discipline consists of at least five credits in English, including:

1. A 100-level credit;
2. English 18.230;
3. A credit in Canadian literature;
4. One credit at the 300 level;
5. One additional credit.

Note:

English 18.200★, 18.201★, 18.268, 18.291 and 18.293 may not be counted towards Combined Pass degree requirements but they may be counted as options towards the degree.

Academic Standing

In order to continue in the Pass program, a student must attain a grade-point average of 4.0 or better in the First-year

course in English. A grade-point average of at least 4.0 must be maintained thereafter in English courses.

Honours Program

All students who meet the general University Honours requirements and who have a grade-point average of at least 6.0 in English, will be admitted to the Honours program. It should be noted that a grade-point average of 6.5 in English is required for continuation after 14 credits and for graduation in Honours. Other applicants will be given individual consideration on application to the Department. The Honours program consists of 20 credits after Grade 13 (25 after Grade 12), of which a minimum of 11 must be in English, including the following:

1. A 100-level credit;
2. English 18.230;
3. A credit in Canadian literature;
4. One credit at the 300 or 400 level in each of the following:
 - (a) Medieval literature;
 - (b) Renaissance literature;
 - (c) Restoration, Eighteenth-century, or Romantic literature;
 - (d) Victorian British literature;
 - (e) Twentieth-century literature;
 - (f) Literary Criticism;
5. Two additional credits.

Of the 11 credits, at least two must be credits at the 400 level.

A single course may satisfy only one requirement in 3 and 4.

Note: Fourth-year standing is interpreted as the completion of 14 credits in the Honours program.

For specific information on which courses offered in 1990-91 will satisfy the above-listed period and seminar requirements, please consult the *Program Handbook* of the Faculty of Arts and Social Sciences 1990-91.

Combined Honours Programs

Combined Honours programs may be arranged. Six credits in English are required, including:

1. A 100-level credit;
2. English 18.230;
3. A credit in Canadian literature;
4. One credit at the 300 or 400 level in British literature in the period prior to 1900;
5. One additional credit at the 300 or 400 level;
6. One additional credit.

Of the six credits, at least one must be a credit at the 400 level. English 18.200★, 18.201★, 18.268, 18.291 and 18.293 may not be counted towards the English requirements for Combined Honours but they may be counted as options towards the degree.

Combined Honours, English and Journalism

A Combined Honours program in English and Journalism may be arranged for students who are admitted to the School of Journalism.

Candidates for the degree of Bachelor of Journalism, Combined Honours Journalism and English, take a total of 20.5 credits, to include Journalism 28.498. The six required English credits are the same as for any other Combined Honours program in English.

Candidates for the degree of Bachelor of Arts, Combined Honours English and Journalism, take a total of 20.5 credits. The six English credits required for the Combined Honours program must include English 18.498.

Certificate in English Language and Composition

This is an in-service certificate intended primarily for practising teachers and designed to upgrade their knowledge of those areas of language and of writing theory which underlie the new Ontario guidelines and support documents.

Admission requirement: a university degree or teaching certificate.

To receive the Certificate in English Language and Composition, students must meet the following requirements:

1. English 18.295;
2. English 18.297;
3. English 18.495;
4. Two credits chosen from the following: English 18.206, 18.305, Linguistics 29.261★, 29.264★, 29.271★, 29.420, or a course approved by the Department.

Note:

The same course cannot be counted towards both a degree and the certificate. If any of the courses required for the certificate have already been taken for a degree, then the student must choose an approved option to replace them. Not all the above-listed courses may be offered in any one year.

Graduate Program

The Department of English Language and Literature offers courses of study leading to the degree of Master of Arts. Students may choose a program consisting of course work and thesis or one consisting of course work and a research essay. For further details consult the Graduate Studies and Research Calendar and the Department's *Handbook of Advice for Graduate Students in English*.

Film Course and Writing Seminars in Poetry and Prose Fiction

The film course (English 18.268) and the writing seminars in poetry and prose fiction (English 18.291 and 18.293) offered in the Department of English Language and Literature carry credit towards the total requirements for the Pass and Honours degree and may be counted among the minimum eleven-credit requirements of the Honours program. They cannot, however, be counted among the minimum six-credit requirements of the Pass program or the Combined Honours program.

Restricted-Enrolment Workshops

Students who wish to enrol in the following courses: English 18.200★ (Theatre Workshop I), English 18.201★ (Theatre Workshop II), English 18.291 (Poetry Workshop) or English 18.293 (Fiction Workshop), should note the following:

1. Enrolment in these workshop courses is restricted.
2. By August 25, 1989, interested students must submit, in the cases of English 18.200★ and 18.201★, a written application on the forms which are available in the Department, or in the cases of English 18.291 and 18.293, a portfolio of their work. Further information about these courses may be obtained from the Department.
3. A list of students admitted into these courses will be posted in the Department on September 1, 1990.
4. During the Fall registration period, all applicants should register in an alternative course or courses to assure themselves that they are in the number of courses they wish to take, in the event they are not admitted to a workshop.

Reading Lists

Detailed reading lists will be available from the Department of English Language and Literature (1812 Dunton Tower) after May 30. The secretariat will mail reading lists only in exceptional circumstances.

Courses of Interest to Students in Other Disciplines

The Department offers a number of courses of special interest to students outside the English programs, such as English 18.101 (English and Continental Texts); English 18.105 (Writing and Language), which seeks to improve the writing of students from all disciplines; English 18.203 (Introduction to the Novel in English); English 18.206 (Children's Literature); English 18.207 (Literature and the Sciences); English 18.208 (Myth and Symbol); English 18.290★ (Literature of the Self); English 18.292 (Women and Literature); English 18.296 (The Writer, Literature and Society).

Courses Offered

English 18.100

English Authors from Chaucer to T.S. Eliot

A study of significant works of English literature, presented as a general historical survey from the fourteenth to the twentieth centuries. The authors to be studied include Chaucer, Marlowe, Shakespeare, Donne, Milton, Pope, Swift, Fielding, Keats, Wordsworth, Browning, Dickens, Tennyson, Yeats, Eliot.

Day and Evening divisions: Three hours a week.

English 18.101

English and Continental Texts

A study of works by English and continental writers. The list of authors to be read usually includes Dante, Boccaccio, Chaucer, Shakespeare, Byron, Flaubert, Tolstoy, Ibsen and O'Casey. Consult the instructor or the Department for complete reading lists. The continental texts are read in translation.

Day division: Three hours a week.

English 18.105

Writing and Language

This course seeks to improve the writing of students from all disciplines through a study of the principles of logic, grammar and rhetoric, and through the application of those principles in frequent writing assignments. Various forms of prose (e.g. scientific, expository, narrative, literary) are studied and practiced.

Not offered 1990-91.

English 18.162

Twentieth-Century Literature

An introduction to literary study, examining the poetry, drama and fiction of the twentieth century, in a representative selection of British, American and Canadian authors. The relation between critical ideas, modern techniques and literary works is emphasized. The course may include works by Lawrence, Conrad, Faulkner, Eliot, Yeats and Williams, and a selection of novels, plays and poems. Lectures three hours a week.

Day and Evening divisions.

English 18.200★

Theatre Workshop I

A course dealing with the rudiments of theatrical performance: voice, movement, improvisation, interpretation. Exercises are based upon examples drawn from the classic and contemporary repertoires.

Note: Enrolment is restricted. See Restricted-Enrolment Workshops, p. 116.

Prerequisite: A 100-level credit in English and permission of the Department.

Not offered 1990-91.

English 18.201★

Theatre Workshop II

A course dealing with techniques of characterization, principles of ensemble performance, scene analysis for actors and directors, styles of performance. Exercises are based upon examples from the classic and contemporary repertoires.

Note: Enrolment is restricted. See Restricted-Enrolment Workshops, p. 116.

Prerequisite: English 18.200★ or permission of the Department.

Not offered 1990-91.

English 18.202

Comedy and Satire

A critical examination of the comic and satiric in English literature through a study of representative plays, novels and short stories. The theory of comedy and satire is examined in relation to the texts: types, techniques and themes.

Prerequisite: Second-year standing.

Not offered 1990-91.

English 18.203

Introduction to the Novel in English

A historical and critical study of the novel from its beginnings in the eighteenth century to the present. Twelve to 15 novels are studied.

English 18.203 and 18.303 (no longer offered) may not both be taken for credit.

Prerequisite: A 100-level credit in English.

Not offered 1990-91.

English 18.205

History of the Language

A course on the nature and development of the sounds, grammar and spelling of the English language, together

with some study of its cultural and stylistic evolution.

Prerequisite: A 100-level credit in English or permission of the Department.

Not offered 1990-91.

English 18.206

Children's Literature

A historical and critical study of children's literature. The course introduces students to critical analysis and assessment of a number of acknowledged classics of children's literature. The organization of works studied is generic, with myth, legend, folklore, fantasy, poetry, drama, allegory, fable and fiction being the principal forms to be considered. A detailed reading list is available from the Department.

Prerequisite: Second-year standing.

Day and Evening divisions: Three hours a week.

English 18.207

Literature and the Sciences

A course concentrating on certain points of intersection between literature and science, using texts from various periods and genres.

Prerequisite: Second-year standing.

Not offered 1990-91.

English 18.208

Myth and Symbol

A study of myth and its appearance in literature. The course explores the great myths that gave form to man's search for meaning, and that still strike a deep response in the psyche. A wide range of texts is used to demonstrate the nature and vitality of myth in both its non-literary and literary forms.

Prerequisite: Second-year standing.

Evening division: Three hours a week.

English 18.209

Greek and Latin Literary Genres

A study through English translations of the various genres of Greek and Latin literature, especially those which influenced later European writing: epic, drama, the ode, pastoral poetry, satire. Offered in the Department of Classics as Classical Civilization 13.209.

Day division: Two hours a week.

English 18.230

British Literature from the Renaissance to the Romantics

A selection of works by major authors, generally including Spenser, Shakespeare, Donne, Milton, Pope, Swift, Coleridge and Wordsworth, is studied intensively. Students are introduced to basic critical vocabulary and to methods of critical analysis. This course should be taken by Pass and Honours students in the Second year.

Prerequisite: A 100-level credit in English.

Day and Evening divisions: Lectures/seminar three hours a week.

English 18.268

Forms and Conventions of the Cinema

This course examines the forms, structures and stylistic conventions of the cinema. Attention is given to the development of a critical idiom suited to the description, analysis and evaluation of film. (Also listed as Film Studies 19.268.)

Prerequisite: Film Studies 19.100 or a 100-level credit in English.

Day division: Three hours lecture and screening, one hour lecture.

English 18.272

Introduction to American Literature

An introduction to the major authors and traditions of American literature from its beginnings to the present.

Prerequisite: A 100-level credit in English or permission of the Department.

Day division: Three hours a week.

English 18.282

Canadian Literature

A survey of the development of Canadian literature in English from its nineteenth-century beginnings to the present.

Prerequisite: A 100-level credit in English or permission of the Department.

Day and Evening divisions: Three hours a week.

English 18.288

Contemporary English-Canadian and French-Canadian Literature

This course, which is offered by faculty members from the English and French Departments, provides a general introduction to and comparison of the two major literatures of Canada. Lectures are given in both English and French. Students are encouraged to use the French language for self-expression but need not do so. (Also listed as Canadian Studies 12.288 and French 20.288.) English 18.188 (no longer offered) and 18.288 may not both be taken for credit.

Prerequisite: A basic reading knowledge of French and a Second-year standing.

Day division: Three hours a week.

English 18.290*

Literature of the Self

A study of the forms, themes and meaning of autobiographical literature. Attention is paid to the history of autobiographical writing and to the autobiography as a social document, but the main focus of the course is on autobiography as part of the modern search for the self.

Prerequisite: Second-year standing.

Not offered 1990-91.

English 18.291

Poetry Workshop

A workshop involving regular assignments in writing poetry and practical criticism based on this work.

Note: Enrolment is restricted. See Restricted-Enrolment Workshops, p. 116.

Prerequisites: A 100-level credit in English and permission of the Department.

Not offered 1990-91.

English 18.292

Women and Literature

An exploration of the feminine perspective in literature as well as the changing role of women in society. A theoretical survey of relevant issues provides a general framework for the course; the main focus, however, is on selected literary texts. Both women authors and the feminine role in works of literature and in the society that produced them are studied.

Prerequisite: Second-year standing.

Evening division: Three hours a week.

English 18.293

Fiction Workshop

A workshop involving regular assignments in writing prose fiction and practical criticism based on this work.

Note: Enrolment is restricted. See Restricted Enrolment Workshops, p. 116.

Prerequisites: A 100-level credit in English and permission

of the Department.

Evening division: Three hours a week.

English 18.294

Drama to the Nineteenth Century

A study of selected significant plays from the classical to the modern period of world drama, including classical, medieval, renaissance, restoration and modern drama.

English 18.294 and 18.304 (no longer offered) may not both be taken for credit.

Prerequisite: A 100-level credit in English.

Not offered 1990-91.

English 18.295

Introduction to the English Language

A course intended particularly as an in-service course for teachers of English and the language arts. The sound system of English in relation to English spelling; English vocabulary, grammar and syntax; stages in the acquisition of English as a first language, especially after age six; roles and uses of English in Canada; standard English pedagogical implications. (Also listed as Linguistics 29.295.)

Prerequisite: Admission to the Certificate in English Language and Composition program or permission of the Department.

Note: This course is chiefly intended for practising or future teachers. It usually meets on an irregular schedule off-campus. Classes may begin before the first week in September. Prospective students should contact the Department to verify their admissibility well in advance of the beginning of the course.

English 18.296

The Writer, Literature and Society

An examination of the roles adopted by the writer in relation to society, either as apologist, social critic, satirist, moralist, visionary or myth-maker. Texts are chosen from a wide variety of historical periods, but the main focus is on the writer in the modern world.

Prerequisite: A 100-level credit in English.

Not offered 1990-91.

English 18.297

Writing: Theory and Practice

A study of the process of writing in theory and practice. Reading and discussions focus on the nature of the composing process; the development of writing abilities from the elementary years to maturity; the interrelationship between talking and writing; strategies for encouraging growth in writing. In addition to examining recent research findings and pertinent theoretical texts, students engage in the composing process themselves in order to ground the theory and research findings in their own experiences as writers. (Also listed as Linguistics 29.297.)

Prerequisite: Second-year standing or enrolment in the Certificate program in English Language and Composition.

Note: This course is chiefly intended for practising or future teachers. It usually meets on an irregular schedule off-campus. Classes may begin before the first week in September. Prospective students should contact the Department to verify their admissibility well in advance of the beginning of the course.

English 18.300

Literary Criticism from Aristotle to the Present

Problems and questions in literary criticism.

Prerequisite: English 18.230 or permission of the Department.

Evening division: Three hours a week.

English 18.302

Contemporary Literary Theory

A study of contemporary approaches to critical analysis: phenomenology, hermeneutics, reception theory, structuralism, semiotics, feminist criticism, dialectical criticism, post-structuralism and deconstruction.

Day division: Three hours a week.

English 18.305

Style, Imagination and Judgment

An examination of the nature of good and bad writing. The category of imagination as a criterion for judging prose. Conditions favorable to the production of good writing. The cultural effects of bad writing.

Prerequisite: Third-year standing or enrolment in the Certificate program in English Language and Composition.

Evening division: Three hours a week.

English 18.312

Old English

A study of Old English language and literature, including grammar and phonology, and translation of selections of Old English prose and poetry.

Prerequisite: A 100-level credit in English or permission of the Department.

Not offered 1990-91.

English 18.322

Chaucer and the Literature of Medieval England

A study of Chaucer's works and of the English language and literature between the Norman conquest and the fifteenth century.

Prerequisite: English 18.230 or permission of the Department.

Evening division: Three hours a week.

English 18.331★

Spenser

A study of the works of Spenser, principally *The Faerie Queene*, in the context of his times and in the light of current criticism.

English 18.331★ cannot be taken for credit in addition to 18.327 (no longer offered).

Prerequisite: English 18.230 or permission of the Department.

Not offered 1990-91.

English 18.332

Renaissance Literature

A study of the great age of English literature. Poetry and prose from Wyatt and More to Donne and Milton are considered, representing such literary movements as Christian humanism, classicism and metaphysical literature.

Students who have taken English 18.337 and 18.338 (no longer offered) may not also take 18.332 for credit.

Prerequisite: English 18.230 or permission of the Department.

Day division: Three hours a week.

English 18.334

Shakespeare

A close study of a selection of Shakespeare's plays; attention is also paid to his environment and his development as a dramatist. English 18.236 (no longer offered) and 18.334 may not both be taken for credit.

Prerequisite: A 100-level credit in English or permission of the Department.

Day and Evening divisions: Three hours a week.

English 18.336★

Milton

A study of Milton's poetry and prose in the context of his age and intellectual background and in the light of current criticism.

Prerequisite: English 18.230 or permission of the Department.

Not offered 1990-91.

English 18.342

Eighteenth-Century Literature

Detailed study of authors and movements of the period 1660 to 1780.

Students who have taken English 18.242 (no longer offered) may not also take 18.342 for credit.

Prerequisite: English 18.230 or permission of the Department.

Not offered 1990-91.

English 18.343

The Novel from Defoe to Scott

A study of selected novelists of the eighteenth century and early nineteenth century.

Prerequisite: English 18.230 or permission of the Department.

Day division: Three hours a week.

English 18.348

Romanticism

A study of major writers, including Wordsworth, Coleridge, Blake, Byron, Keats and Shelley.

Prerequisite: English 18.230 or permission of the Department.

Day division: Three hours a week.

English 18.351

Victorian Poetry

A detailed examination of the poetry of Tennyson, Browning and Arnold, with some attention to related poems of other Victorian authors.

Prerequisite: English 18.230 or permission of the Department.

Day division: Seminar two hours a week.

English 18.353

The Novel from Dickens to Conrad

A study of the English novel from the High Victorian period of Dickens, Thackeray and Eliot to World War I.

Students who have taken English 18.253 (no longer offered) may not also take 18.353 for credit.

Prerequisite: A 100-level credit in English or permission of the Department.

Evening division: Three hours a week.

English 18.361

Twentieth-Century Poetry

An introduction to the poetry of Great Britain, the United States and Canada in the twentieth century.

Prerequisite: A 100-level credit in English or permission of the Department.

Not offered 1990-91.

English 18.362

Literature of Modern Ireland

The English language poetry, drama, and fiction of modern Ireland. The course includes such authors as Yeats, Synge, O'Casey, Shaw, Joyce, Behan, Beckett, Heaney.

Prerequisite: A 100-level credit in English or permission of the Department.

Not offered 1990-91.

English 18.363

Twentieth-Century British Fiction

A study of twentieth-century British fiction. The specific authors may vary from year to year. Consult the Department's reading lists.

Prerequisite: A 100-level credit in English or permission of the Department.

Evening division: Three hours a week.

English 18.364

Modern Drama

An examination of the significant trends that have shaped the development of modern drama from Ibsen and Strindberg to such contemporary dramatists as Beckett, Albee and Pinter. Among the movements discussed and illustrated from relevant plays are realism, symbolism, expressionism, epic theatre, surrealism, theatre of cruelty and theatre of the absurd.

Prerequisite: A 100-level credit in English or permission of the Department.

Day division: Three hours a week.

English 18.371

American Poetry

A study of twentieth-century American poetry to the 1970s. Attention is given to poetic movements and influences.

Prerequisite: English 18.272 or permission of the Department.

Day division: Seminar two hours a week.

English 18.373

American Fiction

A study of the American novel to the present. Attention is given to theories of fiction, movements and influences.

Prerequisite: English 18.272 or a course in the English novel.

Not offered 1990-91.

English 18.381

Canadian Poetry

A study of the development of poetry in Canada through selected poets.

Prerequisite: English 18.282 or permission of the Department.

Not offered 1990-91.

English 18.383

Canadian Fiction

A study of selected Canadian novels and the development of Canadian fiction.

Prerequisite: English 18.282 or permission of the Department.

Day division: Seminar two hours a week.

English 18.387

Selected Topic in Canadian Literature

Prerequisite: English 18.282 or permission of the Department.

Not offered 1990-91.

English 18.390

The Literature of Existentialism

A study of the origins, development and principal characteristics of existentialist literature. (Also listed as Arts and Social Sciences 04.390.)

Prerequisite: At least Third-year university standing.

Evening division: Two hours a week.

English 18.394★

Theatre and Society

A study of the theatre in its social context: two periods of theatre history are studied to illustrate the relations among elements such as theatrical forms and conventions, theatre buildings, theatre occasions and theatre theories, as they occur within specific social circumstances.

Prerequisite: A 100-level credit in English or permission of the Department.

Not offered 1990-91.

English 18.400

Studies in Literary Theory and Criticism

A study of a selected topic in literary theory and criticism. (See Comparative Literature 17.401★, 17.402★.) In 1990-91 the topic is a study of contemporary theories of language mastery and their implications for the study of literature. Authors to be studied include Piaget, Vygotsky, Markova, Moffett and Halliday.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Day division: Seminar two hours a week

English 18.401★

Studies in Poetry

A study of a selected topic in poetry.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Not offered 1990-91.

English 18.403

Studies in the Novel

A seminar for the study and discussion of the art of the novel as exemplified by major works of fiction. Study includes varieties of form and pattern, modes of narration, imagery and symbolism, realism, and naturalism.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Not offered 1990-91.

English 18.404★

Theatre Theory and the Practice of Theatre Criticism

A seminar in which students study classic texts of theatre theory and apply them to the writing of critiques of selected local theatre productions.

Prerequisite: A course in drama or theatre or permission of the Department.

Not offered 1990-91.

English 18.428★

Studies in Medieval Literature I

A study of a selected topic in Medieval literature.

Prerequisite: English 18.322 and Fourth-year standing in Honours English or permission of the Department.

Not offered 1990-91.

English 18.429★

Studies in Medieval Literature II

A study of a selected topic in Medieval literature.

Prerequisite: English 18.322 and Fourth-year standing in Honours English or permission of the Department.

Not offered 1990-91.

English 18.432★

Studies in Renaissance Literature

A study of a selected topic in Renaissance literature. In 1990-91 the topic is a study of the poetry of Donne, Jonson, Herbert and Marvell: the metaphysical and classical styles.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Day division, Fall term: Seminar two hours a week.

English 18.434★

Elizabethan and Jacobean Drama

A study of dramatic literature and production in the period 1580-1640.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Not offered 1990-91.

English 18.436★

Shakespeare

A seminar for Honours students, concentrating on critical and scholarly approaches to Shakespeare's work.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Evening division, Winter term: Seminar two hours a week.

English 18.447★

Studies in Restoration, Eighteenth-Century, and Romantic Literature I

A study of a selected topic in Restoration, Eighteenth-century, and Romantic literature. In 1990-91 the topic is selected plays of the Restoration and Eighteenth century.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Day and Evening divisions, Fall and Winter terms: Seminar two hours a week.

English 18.448★

Studies in Restoration, Eighteenth-Century, and Romantic Literature II

A study of a selected topic in Restoration, Eighteenth-century, and Romantic literature. For Fall 1990, the topic is the poetry of Wordsworth and Coleridge. For Winter 1991, the topic is the poetry of Byron, Shelley and Keats.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Day and Evening divisions, Fall and Winter terms: Seminar two hours a week.

English 18.458

Studies in Victorian Literature

A study of a selected topic in Victorian literature. In 1990-91 the topic is the shaping of the English nineteenth-century mind; the influences of Romantic critics such as Burke and Coleridge, and Victorian intellectuals such as Carlyle, Mill, Newman, Ruskin, Arnold and Morris.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Evening division: Seminar two hours a week.

English 18.461★

Selected Topic in Twentieth-Century British Poetry

A study of a selected topic in twentieth-century British poetry. In 1990-91 the topic is developments in Early Modernism, the significance of the Symbolist and Imagist movements. Major authors include Hopkins, Yeats, Lawrence, Eliot, Pound and Hilda Doolittle.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Day division, Winter term: Seminar two hours a week.

English 18.467★

Studies in Twentieth-Century British Literature I

A study of a selected topic in British literature of the twentieth century. In 1990-91 the topic is Apocalyptic Narrative and the Literature of the End.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Evening division, Fall term: Seminar two hours a week.

English 18.468★**Studies in Twentieth-Century British Literature II**

A study of a selected topic in British literature of the twentieth century. In 1990-91 the topic is the Early Moderns, concentrating on technical innovation in the first two decades of this century as seen in the poetry of Hopkins, Hardy, the Imagists, Owen, the early Yeats, and Eliot's *Prufrock* volume.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Day division, Fall term: Seminar two hours a week.

English 18.471★**Selected Topic in American Poetry**

A study of a selected topic in American poetry. In 1990-91 the topic is Post-Modern developments in American Poetry and Poetics with emphasis on the experimental use of non-referential techniques by the new "Language" Poets of the past two decades. Authors include: Andrews, Bernstein, Bromige, Hejninian, Mac Low, Palmer, Perelman, Silliman.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Day division, Winter term: Seminar two hours a week.

English 18.478★**Studies in American Literature I**

A study of a selected topic in American literature. In 1990-91 the topic is American romanticism, with particular reference to Emerson, Thoreau, Whitman, Poe, Melville and Mark Twain.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Day division, Fall term: Seminar two hours a week.

English 18.479★**Studies in American Literature II**

A study of a selected topic in American literature. In 1990-91 the topic is Varieties of Utopian Experience.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Evening division, Fall term: Seminar two hours a week.

English 18.481★**Selected Topic in Canadian Poetry**

A study of a selected topic in Canadian poetry.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Not offered 1990-91.

English 18.483**Studies in the Literature of Quebec and English Canada**

A study of selected works of the literatures of Quebec and English Canada. In 1990-91 the topic is literature and social change, with a focus on nationalism, radical politics, feminism, and minority relations.

Prerequisites: Fourth-year standing in Honours English or permission of the Department.

Day division: Seminar two hours a week.

English 18.486★**Studies in Canadian Literature I**

A study of a selected topic in Canadian literature. In 1990-91 the topic is exile, displacement and alienation as they manifest themselves in certain works of Canadian fiction. The emphasis is on the work itself, its structure, fictional strategies, its cultural impact, and its literary and historical context.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Evening division, Fall term: Seminar two hours a week.

English 18.487★**Studies in Canadian Literature II**

A study of a selected topic in Canadian literature. In 1990-91 the topic is the form of linked short stories in Canadian literature. Authors to be studied include D.C. Scott, G. Roy, M. Laurence, A. Munro, H. Hood.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Evening division, Winter term: Seminar two hours a week.

English 18.495**Research Seminar in English and Education**

Investigation of recent developments in language study, rhetoric and composition, and studies of the literary imagination and their implications for the teaching of English. (Also listed as Linguistics 29.495.)

Prerequisite: English 18.295 and 18.297 or permission of the Department.

Note: This course is chiefly intended for practising or future teachers. It usually meets on an irregular schedule off-campus. Classes may begin before the first week in September. Prospective students should contact the Department to verify their admissibility well in advance of the beginning of the course.

English 18.496★**Studies in African or Caribbean Literature**

A study of a selected topic in African or Caribbean literature.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Not offered 1990-91.

English 18.497★**Studies in Australian and New Zealand Literature or Indian Literature in English**

A study of a selected topic in Australian and New Zealand literature or Indian literature in English.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Not offered 1990-91.

English 18.498**Independent Study**

A course for independent research and writing, under the supervision of a member of the Department, open to students in the Fourth year of Honours with a B+ standing in their English courses. An essay of approximately 10,000 words is the usual written assignment. A written request, outlining the project, with the approval of the supervisor, must be submitted to the co-ordinator by the last day for course changes.

Note: This course may be used to fulfil one of the seminar requirements for the Honours degree, but it cannot fulfil an area requirement or substitute for English 18.230. For students in Combined Honours, however, it is considered to be the equivalent of an Honours Essay.

English 18.499**Seminar**

The course considers the role of English studies in a complex system of higher education.

Prerequisite: Fourth-year standing in Honours English or permission of the Department.

Not offered 1990-91.

St. Patrick's Building, Room 427
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Officers of Instruction

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George McKnight

Professors
Christopher G. Faulkner
Peter Harcourt

Associate Professors
Mark Langer
Patrick MacFadden (*Journalism*)
George McKnight
Zuzana Pick

Assistant Professor
William Straw

General Information

Film Studies is an academic discipline concerned with the history, criticism, theory and practice of the cinema both as an art form and as a documentary record of our time. The cinema is a source of pleasure and knowledge, and its study should form a part of one's cultural education. The program will enable the student to develop a critical faculty appropriate to intelligent understanding of the cinema by approaching its study as a scholarly activity that rewards systematic research, analysis and exposition.

In designing the curriculum, the Department has sought both integration and progressive development. A careful curricular development will ensure intellectual growth through either a Pass or Honours program devoted to the study of film. While the courses have been articulated together, they remain distinct enough to permit a number of related intellectual approaches to the study of film, and to enable those approaches to be related to work in other disciplines.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Pass Programs

Pass Program

All students who elect a Pass program in Film Studies must have their program approved by a member of the Department of Film Studies. The Pass program in Film Studies consists of a minimum of six credits in Film Studies, as follows:

1. Film Studies 19.100;
2. Film Studies 19.200;

3. two credits in Film Studies at the 300 level, one of which must be either Film Studies 19.300 or 19.350;

4. two additional credits in Film Studies beyond the 100 level.

Combined Pass Programs

Combined Pass programs may be arranged with other departments in the Faculties of Arts or Social Sciences. Both departments must approve a Combined Pass program.

A Combined Pass program in Film Studies and another subject includes at least five credits in Film Studies, as follows:

1. Film Studies 19.100;
2. Film Studies 19.200;
3. two credits in Film Studies at the 300 level;
4. one additional credit in Film Studies beyond the 100 level.

Honours Programs

Honours Program

All students who meet the general University Honours requirements, and who have a grade-point average of at least 6.0 in Film Studies, will be admitted to, and permitted to continue in, the Honours program. Other applicants will be given individual consideration on application to the Department. Honours students must have their program approved by a departmental adviser.

Honours in Film Studies consists of a minimum of nine credits in Film Studies as follows:

1. Film Studies 19.100;
2. Film Studies 19.200;
3. Film Studies 19.300 and 19.350;
4. two credits in Film Studies at the 400 level;
5. three additional credits in Film Studies beyond the 100 level.

Combined Honours Programs

Combined Honours programs may be arranged through the departmental adviser. Both departments must approve a Combined Honours program. A Combined Honours program in Film Studies and another subject includes at least seven credits in Film Studies, as follows:

1. Film Studies 19.100;
2. Film Studies 19.200;
3. Film Studies 19.300 or 19.350;
4. one credit in Film Studies at the 400 level;
5. three additional credits in Film Studies beyond the First year, one of which must be at the 300 level or above.

Courses Offered

For a detailed statement of course offerings for 1990-91 please consult the Department of Film Studies after May 1, 1990.

Film Studies 19.100

Introduction to Film Studies

An introduction to the study of film. Consideration is given to the nature of the medium, audience perception, historical and technical development of the cinema, and problems of theory and critical method. The course focuses on four specific areas: (a) style and technique; (b) a period in film history; (c) the film maker; and (d) film genres.

Day and Evening divisions: Lecture and screening three hours a week, discussion one hour a week.

Film Studies 19.200

Film Theory, Aesthetics and Criticism

This course examines basic questions of film theory, aesthetics and criticism. Emphasis is given to developing critical skills through a close analysis of films and theoretical writings.

Prerequisite: Film Studies 19.100 or permission of the Department.

Day division: Lecture and screening three hours a week, lecture one hour a week.

Film Studies 19.211★

The Film Industry

This course examines the organization of the production, distribution and exhibition practices of various film industries and may include an examination of the relationship between a national film industry and its television.

Prerequisite: Film Studies 19.100 or permission of the Department.

Not offered 1990-91.

Film Studies 19.215

The Documentary

This course examines the work of individual film makers, of documentary styles and of organizations and institutions in the context of the history of documentary film making, including documentaries made for television. Non-fiction films other than documentaries may be considered. (Also listed as Journalism 28.215.)

Prerequisite: Film Studies 19.100 or permission of the Department.

Lecture and screening two hours, two days a week.

Film Studies 19.221★

National Cinema

This course examines the film production of specific countries in order to determine the themes, the styles, and the character of a national cinema. Topic for 1990-91: *Soviet Cinema*.

Prerequisite: Film Studies 19.100.

Day division, Fall term: Lecture and screening three hours a week, lecture one hour a week.

Film Studies 19.241★

The Film Maker

A detailed study of the themes, the characteristic style, development and influence of one or more directors.

Prerequisite: Film Studies 19.100.

Lecture and screening three hours a week, lecture one hour a week.

Film Studies 19.261★

Film Genres

This course examines questions of generic form, drawing examples from the world cinema.

Prerequisite: Film Studies 19.100.

Lecture and screening three hours a week, lecture one hour a week.

Film Studies 19.268

Forms and Conventions of the Cinema

This course examines the forms, structures and stylistic conventions of the cinema. Attention is given to the development of a critical idiom suited to the description, analysis, and evaluation of film. (Also listed as English 18.268.)

Prerequisite: Film Studies 19.100 or a First-year course in English.

Lecture and screening three hours a week, seminar one hour a week.

Film Studies 19.300

Aspects of Film History

A study of the major histories of film. Special attention is paid to the historiographical assumptions, the critical judgments and the cultural values that have affected past and present evaluations of the cinema.

Prerequisite: Film Studies 19.200, or permission of the Department.

Day division: Lecture and screening three hours a week, lecture one hour a week.

Film Studies 19.315★

Questions of Documentary Practice

This course examines the theoretical implications of documentary film and documentary television practice.

Prerequisite: A full credit or its equivalent in Film Studies at the 200 level, or permission of the Department.

Not offered 1990-91.

Film Studies 19.325

Studies in American Cinema

Cultural, social and organizational studies of the American cinema. The course focuses on various features of this cinema such as the major production companies, the star system, genres, film style, and the role of the individual film maker. The course may also examine the relationship between American cinema and American television.

Precludes additional credit for Film Studies 19.228 (no longer offered).

Prerequisite: A full credit or its equivalent in Film Studies at the 200 level, or permission of the Department.

Not offered 1990-91.

Film Studies 19.328

The Canadian Cinema

A critical examination of Canadian film, both anglophone and francophone. The course relates the Canadian cinema to other aspects of Canadian culture, including Canadian television, and examines the conditions that have affected film making in this country.

Prerequisite: Third-year standing or permission of the Department.

Screening three hours a week, lecture one hour a week.

Film Studies 19.333

Film and Society

An examination of film in relation to social and intellectual developments of the twentieth century. The ways in which the cinema has both shaped and been shaped by some of these developments are considered. (Also listed as Journalism 28.333.)

Prerequisite: Film Studies 19.100 or Third-year standing.

Day division: Screening three hours a week, lecture one hour a week.

Film Studies 19.350

Film Theory

A detailed study of major film theories and their relationship to critical practice.

Precludes additional credit for Film Studies 19.368 (no longer offered).

Prerequisite: Film Studies 19.200, or permission of the Department.

Screening three hours a week, seminar two hours a week.

Film Studies 19.371★

Topics in Animation, Video, and Experimental Film

A study of selected topics in animation, video or experimental film.

Prerequisite: A full credit or its equivalent in Film Studies at the 200 level, or permission of the Department.

Not offered 1990-91.

Film Studies 19.400

Modes of Historical Research

This course develops the skills necessary for individual research in the field of film history.

Prerequisite: Film Studies 19.300 or permission of the Department.

Not offered 1990-91.

Film Studies 19.421★

Selected Topics in National Cinemas

A study of a selected topic in national cinema.

Prerequisite: Fourth-year Honours standing in Film Studies or permission of the Department.

Screening three hours a week, seminar two hours a week.

Film Studies 19.441★

Selected Topics in Film Authorship

A study of questions of authorship in the cinema, concentrating on one or more film makers.

Prerequisite: Fourth-year Honours standing in Film Studies or permission of the Department.

Not offered 1990-91.

Film Studies 19.451★

Selected Topics in Film Theory

A study of a selected topic in film theory.

Prerequisite: Film Studies 19.350 or permission of the Department.

Not offered 1990-91.

Film Studies 19.461★

Studies in Film Analysis

An analysis of individual films in relation to questions of critical practice.

Prerequisite: Fourth-year Honours standing in Film Studies or permission of the Department.

Day division, Winter term: Screening three hours a week, seminar two hours a week.

Film Studies 19.491★

Special Topic

This course offers selected topics in film studies not ordinarily available in the regular course program. The choice of topic or topics will vary at least every two years and will be announced well in advance of the registration period.

Prerequisite: Fourth-year standing in Film Studies, or permission of the Department.

Not offered 1990-91.

Film Studies 19.495

Independent Study

A research course for selected students who wish to study a topic of particular interest. The course may be taken only

once and is available to students in the Fourth year only. Projects must be organized on an individual basis with a member of the Film Studies Department and approved by the Chair. A written request outlining the project must be submitted by the last day for course changes. An essay of 6,000 to 8,000 words is the usual assignment. Instead of a research paper, the Department may accept projects such as a short 16mm film or video production, or a screenplay. Prerequisite: Permission of the Department and Fourth-year Honours standing in Film Studies.

Graduate Study

While Film Studies does not offer a graduate program, a graduate-level course, Canadian Cinema (Film Studies 19.528), is taught by a member of the Department through the Institute of Canadian Studies. Further information is available in the Calendar of the Faculty of Graduate Studies and Research.

Summer and Evening Study

Film Studies 19.100 will be offered every year during the Fall/Winter division. In addition, a different upper level course will be offered each year during the Fall/Winter Evening division. It may not be possible, however, to obtain a degree in Film Studies through the Summer or Evening divisions alone.

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Officers of Instruction

Chairman

To be announced

Assistant Chairman

To be announced

Supervisor of Pass Studies

C. Doutrelepon

Supervisor of Honours Studies

E. Zimmerman

Supervisor of Graduate Studies

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E.N. Zimmerman

Assistant Professors

C. Doutrelepon
R. Fournier
J. LeBlanc
A. Ruprecht

Senior Lecturer

W.M. Fraser

Instructors

V. Basseville
B. Burke
C. Cordier-Gauthier
L. Dupuis
M. Laurier
D. Rosse
N. Sarma

Adjunct Professors

C.P. Fleischauer
J.S. Tassie

Sessional Lecturers

J.P. Brodel
F. Carbon

M. Conway
S. Dupont
M. Gauthier
H. Gervais
S. Hotte
M.C. Jubinville-Buss
J. Landru
J. McMillan
D. Moffet
S. Ouellet
M.-A. Rousseau-Beecher
Y. Sadeg
B. Séguin
P. Siguret

General Information

Carleton University is situated in a bilingual community, and students are encouraged to take advantage of the multiple opportunities for practical appreciation of the language. Radio, television, cinema, stage, the press and everyday conversation are at hand to supplement academic programs. The Department of French has a special housing service, which allows students to live with francophone families. Classes are conducted in French unless otherwise indicated. The Department also has at its disposal a fully equipped language laboratory.

English-speaking students who wish to graduate with Pass or Honours standing in French are normally required to pass an oral examination testing their proficiency in spoken French. The examination takes place at the beginning of their final year, with the option of repeating it at the end of that year.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp.38-39) and all Faculty regulations (see pp.65-66), in addition to all departmental regulations and requirements as set out below.

Student Exchanges

The Department of French has two student exchanges, one with the *Université du Québec* in Trois-Rivières, and the other with the *Université de Savoie* in Chambéry, France. These exchanges make it possible for a maximum of six English-speaking Honours students (three of whom go to Québec and three to France) to spend their Third year in an immersion milieu. Financial assistance is also available. For more information please consult the Chairman of the Department.

Pass Programs

1. Pass in French

The following program will help students to consolidate their knowledge of French grammar and to gain a comprehensive view of various aspects of French and French-Canadian literature.

This program consists of six credits.

In the First year, students normally take either French 20.111 or 20.112. Students also take one of the following: French 20.161, 20.162 or 20.163.

In the Second year, students normally take French 20.211 (for Anglophones) or 20.212 (for Francophones) or French 20.232★ and French 20.233★ and, in addition, two half credits in literature chosen from the series French 20.261★ to 20.268★. One of French 20.280★, 20.281★ may be taken as partial fulfilment of the Second-year literature requirements.

In the Third year, students normally take one credit from French 20.312 or 20.332 or 20.333★ and 20.334★ and, in addition, one literature credit chosen from the series French 20.361 to 20.381 or, exceptionally and only with permission, French 20.461 to 20.469★.

Students should note that at least one of the literature credits must be obtained in a course or courses with a French content, and at least one in a course or courses with a French-Canadian content. The literature credit taken in First year can be counted in this context.

2. Combined Pass

Combined Pass programs are available in French and other modern or classical languages, linguistics, or with another discipline in the humanities or social sciences.

This program consists of five credits.

In the First year, students normally take either French 20.111 or 20.112. Students also take one of the following: French 20.161, 20.162 or 20.163.

In the Second year students normally take French 20.211 (for Anglophones) or 20.212 (for Francophones) and two half credits in literature chosen from the series French 20.261★ to 20.268★. One of French 20.280★, 20.281★ may be taken as partial fulfilment of the Second-year literature requirements.

In the Third year students normally take either one credit from French 20.312 or 20.332 or 20.333★ and 20.334★ or a literature credit chosen from the series French 20.361 to 20.381 or, exceptionally and only with permission, French 20.461 to 20.469★.

Students should note that at least one of the credits in literature must be in a course or courses with a French content, and at least one in a course or courses with a French-Canadian content. The literature credit taken in First year can be counted in this context.

Honours Programs

Several Honours programs are available. Course patterns are designed to assure a balanced appreciation of French and French-Canadian literature, with competence in oral and written expression in the French language. Interested candidates will note the general regulations governing Honours on pp.63-64.

Note: Honours students intending to choose the language-linguistics concentration would be well advised to take the required course Linguistics 29.100 during their First year.

Honours in French

This program is particularly suitable for students intending to pursue graduate studies in the field of romance languages, literature and related fields.

Students in the Honours program must declare their con-

centration in the Second year. There are two areas of concentration in the French Honours program:

Concentration A:

This program consists of seven credits in literature and three credits in French language and linguistics.

Two credits are also taken in one language other than French or English. Students who already have the knowledge of a third language and can furnish appropriate proof may be exempted, in whole or in part, from this requirement.

In the First year, students normally take either French 20.111 or 20.112. Students also take one of the following: French 20.161, 20.162 or 20.163.

Two further credits in French language and linguistics are chosen from French 20.211 (for Anglophones) 20.212 (for Francophones), French 20.232★ and 20.233★, 20.312, 20.332, 20.333★ and 20.334★, 20.432★ to 20.435. At least one of these credits must be at the 300/400 level.

Six further credits in literature are normally chosen as follows:

Second Year: four half credits from the series French 20.261★ to 20.268★; One of French 20.280★, 20.281★ may be taken as partial fulfilment of the second year literature requirements.

Third Year: two credits from the series French 20.361 to 20.381;

Fourth Year: two credits from French 20.434★ and the series 20.461 to 20.469★.

Students should note that two of the literature credits must be obtained in courses with a French content, and two in courses with a French-Canadian content. The literature credit taken in First year can be counted in this context.

Concentration B:

This program consists of seven credits in French language and linguistics and three credits in literature. Students are also required to take Linguistics 29.100 and must obtain one credit in a language other than French or English. Students who already have the knowledge of a third language and can furnish appropriate proof may be exempted from the language credit requirement.

In the First year, students normally take either French 20.111 or 20.112. Students also take one of the following: French 20.161, 20.162 or 20.163.

Two further credits in literature are selected as follows: two half credits chosen from the series French 20.261★ to 20.268★; one credit chosen from the series French 20.361 to 20.381 or 20.461 to 20.469★.

One of French 20.280★, 20.281★ may be taken as partial fulfilment of the Second-year literature requirements.

Six further credits in French language and linguistics are normally taken as follows:

Second year: French 20.211 (for Anglophones) or 20.212 (for Francophones) and French 20.232★, 20.233★ or 20.231.

Third year: French 20.312 and a credit from the series French 20.332 to 20.334★ or 20.331 and a credit from the series French 20.312 to 20.334★.

Fourth Year: two credits chosen from French 20.431 to 20.435.

Students should note that one of the literature credits must

be obtained in a course or courses with a French content, and one in a course or courses with a French-Canadian content. The literature credit taken in First year can be counted in this context.

Combined Honours

Combined Honours programs are available in French and English, German, History, Italian, Latin, Linguistics, Political Science, Russian or Spanish, and with other departments by arrangement.

The Honours programs combining two languages prepare the student either for graduate work or for the Ontario College of Education courses leading to the Interim High School Assistant's Certificate Type A, and must be planned in close consultation with the departments concerned. The combined programs with History or Political Science are suited for various kinds of public careers.

Two areas of concentration have been created in the Combined Honours program:

Concentration C:

This program consists of five credits in literature and two credits in French language and linguistics.

In the First year, students normally take either French 20.111 or 20.112. Students also take one of the following: French 20.161, 20.162 or 20.163.

One further credit in French language and linguistics is chosen from French 20.211 (for Anglophones), 20.212 (for Francophones).

Four further credits in literature are normally chosen as follows:

Second Year: two half credits from the series French 20.261★ to 20.268★; one of French 20.280★, 20.281★ may be taken as partial fulfilment of the Second-year literature requirements.

Third Year: one credit from the series French 20.361 to 20.381;

Fourth Year: two credits from French 20.434★ and the series French 20.461 to 20.469★.

Students should note that at least one and a half of the literature credits must be obtained in courses with a French content, and at least one and a half in courses with a French-Canadian content. The literature credit taken in First year can be counted in this context.

Concentration D:

This program consists of five credits in French language and linguistics and two credits in literature. One credit is also taken in Linguistics 29.100.

In the First year, students normally take either French 20.111 or 20.112. Students also take one of the following: French 20.161, 20.162 or 20.163.

One further credit in literature consists of two half credits from the series French 20.261★ to 20.268★ or, with permission, a credit chosen from the series French 20.361 to 20.381, or from French 20.461 to 20.469★, or the course French 20.434★; one of French 20.280★, 20.281★ may be taken as partial fulfilment of the Second-year literature requirements.

Four further credits in French language and linguistics are normally chosen as follows:

Second Year: French 20.211 (for Anglophones) or 20.212 (for Francophones) or 20.232★ and 20.233★;

Third Year: French 20.312

Fourth Year: two credits from the series French 20.432★ to 20.435.

Students should note that at least one half credit in literature must be obtained in a course with a French content, and at least one half credit in a course with a French-Canadian content. The literature credit taken in First year can be counted in this context.

Combined Honours in French and Journalism for the B.J. Degree

The course requirements are as follows:

1. One of French 20.108, 20.110, 20.111 or 20.112; One of French 20.161, 20.162 or 20.163; French 20.210; One credit from the series French 20.261★ to 20.268★; French 20.310; Two further French credits at the 400 level.
 2. Journalism 28.100, 28.200, 28.220, 28.320, 28.351★, 28.421, 28.498. *Note:* Journalism 28.320 is a two-credit course.
 3. An approved credit in Canadian history.
 4. Approved options to make up a program total of 20.5 credits.
- Students should also consult the School of Journalism.

Certificate in French Language Studies

This is a six-credit undergraduate certificate designed for part-time students wishing to perfect their spoken and written French. Candidates for the certificate are also encouraged to investigate undergraduate degree programs offered by the University. Courses taken for the certificate are normally creditable towards a Bachelor of Arts degree. Such a degree program will normally require that at least five of the credits required for a Bachelor of Arts degree be completed after the awarding of the certificate.

Admission Requirements

1. See p. 25.

Course Requirements

The following courses or combinations of courses are required, for candidates with the normal prerequisite:

1. French 20.111 or 20.112;
2. French 20.211 or 20.212;
3. French 20.231;
4. French 20.232★ and 20.233★;
5. French 20.312 or 20.332 or 20.333★ and 20.334★;
6. One credit from French 20.331, 20.431, 20.432★ or 20.433★.

For candidates with knowledge of French to the level of French 20.111:

1. French 20.211 or 20.212;
2. French 20.231;
3. French 20.232★ and 20.233★;
4. One of French 20.312, 20.332, or 20.333★ and 20.334★;

5. French 20.331 or 20.431;

6. French 20.432★ and 20.433★.

Students are not permitted to count the same course(s) towards both certificates offered by the Department of French. Should any student undertake a second certificate, appropriate course substitutions will be required.

Certificate in French Translation Studies

This is a six-credit undergraduate certificate designed for part-time students wishing to develop and improve skills in translation. While it is not a professional program, this certificate should meet the needs of those who are occasionally called upon to translate in their work environment. Candidates for the certificate are also encouraged to investigate undergraduate degree programs offered by the University. Courses taken for the certificate are normally creditable towards a Bachelor of Arts degree. Such a degree program will normally require that at least five of the credits required for a Bachelor of Arts degree be completed after the awarding of the certificate.

Admission Requirements

See p. 25

Course Requirements

The following courses or combinations of courses are required, for candidates with the normal prerequisite:

1. French 20.111 or 20.112 or, with the approval of the Department of French, a course given in French in a subject other than French;
2. French 20.231;
3. French 20.312 (or French 20.432★ and 20.433★);
4. French 20.331;
5. French 20.431;
6. French 20.483 (a tutorial in translation).

Students are not permitted to count the same course(s) towards both certificates offered by the Department of French. Should any student undertake a second certificate, appropriate course substitutions will be required.

Graduate Program

The Department offers studies leading to the M.A. degree. The Department offers a substantial number of courses in a wide variety of subjects. For further information please consult the Graduate Studies and Research Calendar.

Courses Offered

French Placement for Language Students

Students who have not previously taken a language course in the Department and who wish to enrol in French 20.100, 20.101★, 20.102★, 20.103★, 20.104★, 20.105★, 20.106★, 20.107★, 20.108, 20.110, 20.111, 20.112, 20.206★, 20.209★ must consult the Department for French Placement.

The French Department offers French 20.110, 20.210 and 20.310 for Journalism students.

Note:

Students desiring a First-year French credit to satisfy the language requirement of their department or school should consult that department or school as to the acceptability of French 20.100, 20.101★, 20.102★, 20.103★, 20.104★, 20.105★, 20.106★, 20.107★, 20.108★, 20.108, 20.110.

French 20.100

Elementary French

This course is designed for absolute beginners in the language. Classes use audio-visual methods, and emphasis is given to the spoken language. Limited enrolment per section. No auditors. Compulsory attendance at classes. No supplemental or grade-raising examinations. The credit gained from this course will not count as part of the specific requirements for a Pass or Honours degree in French.

Prerequisite: French Placement.

Day and Evening divisions: Five hours a week.

N. Sarma and members of the Department.

French 20.101★

Aural Training

Improvement of auditory discrimination in French. Insistence on rhythm and intonation. Transition from hearing to oral performance. Development of strategies relating to sound discrimination. Limited enrolment per section. No auditors. Compulsory attendance at classes. No supplemental or grade-raising examinations. The half-credit gained from this course will not count as part of the specific requirements for a Pass or Honours degree in French.

Prerequisite: French 20.100 or French Placement.

Day and Evening divisions, Fall and Winter terms: Three hours a week, one term.

French 20.102★

Spoken Language Grammar

The acquisition of a communication grammar based on fundamental structures of oral language. Use in context and situation. Interaction between sound and meaning. Limited enrolment per section. No auditors. Compulsory attendance at classes. No supplemental or grade-raising examinations. The half-credit gained from this course will not count as part of the specific requirements for a Pass or Honours degree in French.

Prerequisite: French 20.100 or French Placement.

Day and Evening divisions, Fall and Winter terms: Three hours a week, one term.

C. Cordier-Gauthier and members of the Department.

French 20.103★

Functional French

The discovery of functions (questioning, comparing, narrating, etc.) and notions (expression of duration, possession, negation, etc.) based on recordings and situations of everyday spoken French. Simulation exercises in which students use creatively the linguistic elements implied in the functions and notions studied. Limited enrolment per section. No auditors. Compulsory attendance at classes. No supplemental or grade-raising examinations. The half-credit gained from this course will not count as part of the specific requirements for a Pass or Honours degree in French.

Prerequisite: French 20.100 or French Placement.

Day and Evening divisions, Fall and Winter terms: Three hours a week, one term.

French 20.104★**Thematic French**

The enrichment of vocabulary, review of different aspects of spoken French. The discovery of the cultural aspects based on thematic material (health, leisure, travel, food, etc.). The development of the capacity to exchange ideas in a second language. Limited enrolment per section. No auditors. Compulsory attendance at classes. No supplemental or grade-raising examinations. The half-credit gained from this course will not count as part of the specific requirements for a Pass or Honours degree in French. Prerequisite: French 20.100 or French Placement.

Day and Evening divisions, Fall and Winter terms: Three hours a week, one term.

French 20.105★**Writing French**

The transition from the oral to the written form, using written documents: notes, messages, letters, compositions and texts. Introduction to and improvement of writing skills; acquisition of basic idioms. Limited enrolment per section. No auditors. Compulsory attendance at classes. No supplemental or grade-raising examinations. The half-credit gained from this course will not count as part of the specific requirements for a Pass or Honours degree in French. Prerequisite: French 20.100 or French Placement.

Day and Evening divisions, Fall and Winter terms: Three hours a week, one term.

French 20.106★**Reading French**

This course, given in English, is designed to enable specialists from other departments in the humanities, social sciences and sciences to read technical texts in French with reasonable ease. The goal is comprehension of the written word only. The course involves basic French grammar, the reading of selected material from various fields, and an individual assignment in the student's specialization. The course is open to beginners. Registration by permission of the department. The half credit gained from this course will not count as part of the specific requirements for a Major or Honours degree in French. No auditors.

Day division: One and a half hours a week throughout the year.

B. Burke and members of the Department.

French 20.107★**Written Grammar**

The acquisition of the fundamental structures of written French. Exercises to develop grammatical competence in the use of agreements in gender and number, principal verb tenses, sentence patterns, etc. Limited enrolment per section. No auditors. Compulsory attendance at classes. No supplemental or grade-raising examinations. The half-credit gained from this course will not count as part of the specific requirements for a Pass or Honours degree in French. Prerequisite: French 20.100 or French Placement.

Day and Evening divisions, Fall and Winter terms: Three hours a week, one term.

French 20.108**Advanced French for Non-Majors**

Intensive study of the French language for students from other departments, based on audio-oral principles. Emphasis is placed on oral comprehension and expression, without omitting the written aspects of the language. The student is encouraged to speak French. Compulsory attendance at both classes and laboratory. No auditors. Limited enrolment per section. No supplemental or grade-raising examinations.

Prerequisite: French Placement, or for students who have completed French 20.100, four recommended courses based on French Placement from the series French 20.101★, 20.102★, 20.103★, 20.104★, 20.105★, 20.107★.

Day and Evening divisions: Three hours a week.

L. Dupuis and members of the Department.

French 20.109**Advanced Immersion French (two credits)**

A course in the Summer Language Program combining the subject matter of two advanced-level courses, French 20.108 and 20.111, for the development of oral proficiency as well as written and grammatical expression. Extra-curricular activities are organized outside regular class hours. Only one of the credits gained from this course will count as part of the specific requirements for a Major or Honours in French. Offered only in the Day division of the Summer session. Compulsory attendance at all classes and participation in all activities; no supplemental or grade-raising examinations. Enrolment limited to 20 students per section. No auditors.

Exclusions: Students already holding credit for, or taking French 20.108, 20.111 or 20.112 are ineligible for this course.

Not offered 1990-91.

French 20.110**Advanced French for Journalism Students**

Intensive study of the French language for students in Journalism. The course is based on audio-oral methods, with emphasis on oral comprehension and expression. Study of the French press: oral reports and written assignments. Compulsory attendance at classes. No auditors. Limited enrolment per section. No supplemental or grade-raising examinations.

Prerequisite: French Placement, or for students who have completed French 20.100, four recommended courses based on French Placement from the series French 20.101★, 20.102★, 20.103★, 20.104★, 20.105★, 20.107★.

Day division: Three hours a week.

B. Burke and members of the Department.

French 20.111**Advanced French (A)**

Intensive study of the French language with particular attention to the vocabulary, syntax and the various levels of speech, in context. Grammatical analysis of literary texts. Oral reports and written assignments. This course is particularly designed for Anglophone students intending to specialize in French.

Compulsory attendance. No auditors.

The students' language proficiency will be verified during the first week of classes.

Prerequisite: French Placement, or for students who have completed French 20.100, four recommended courses based on French Placement from the series French 20.101★, 20.102★, 20.103★, 20.104★, 20.105★, 20.107★.

Day and Evening divisions: Three hours a week.

French 20.112**Advanced French (B)**

Comprehensive study of modern grammar. Acquisition of an extensive vocabulary. Grammatical study of literary texts, both prose and poetry. This course is particularly designed for Francophone and bilingual students intending to specialize in French.

Compulsory attendance. No auditors.

The students' language proficiency will be verified during the first week of classes.

Day and Evening divisions: Three hours a week.

French 20.151

French-Canadian Literature

A course for students who do not intend to select French as a Major or Honours subject. Its purpose is to present the student with a survey of French-Canadian literature with emphasis on contemporary authors. Students are encouraged to use the French language for self-expression but need not do so. English may occasionally be used by the instructor.

Not offered 1990-91.

French 20.152

French Literature

A course for students who do not intend to select French as a Major or Honours subject. Its purpose is to present the student with a survey of French literature, with emphasis on contemporary authors. Students are encouraged to use the French language for self-expression but need not do so. English may occasionally be used by the instructor.

Not offered 1990-91.

French 20.161

Introduction to Literature: French Texts from the Seventeenth to the Nineteenth Century

This course introduces the student to a certain number of general views on literature with particular attention to the following: the basic elements of a literary work (characters, story, plot, subjects, themes), the problems of interpretation, the intentions of the author and the perception of the reader, the work in its various contexts: biographical, literary, sociological; the formal aspects typical of certain genres, particularly the drama and poetry. The texts illustrating these aspects in French literature are selected within the period from the Middle Ages to the end of the nineteenth century.

Prerequisite: OAC in French, or equivalent.

Day division: Three hours a week.

C. Doutelepoint

French 20.162

Introduction to Literature: French Texts from the End of the Nineteenth Century to the Present

This course introduces the student to a certain number of general views on literature with particular attention to the following: the basic elements of a literary work (characters, story, plot, subjects, themes), the problems of interpretation, the intentions of the author and the perception of the reader, the work in its various contexts: biographical, literary, sociological; the formal aspects typical of certain genres, particularly the drama and poetry. The texts illustrating these aspects in French literature are selected within the period from Zola (nineteenth century) to the present day. Students taking this course will not be allowed to count French 20.266★ as part of the specific requirements for a Major or Honours degree in French.

Prerequisite: OAC in French, or equivalent.

Day division: Three hours a week.

E.N. Zimmerman

French 20.163

Introduction to Literature: French-Canadian Texts from the End of the Nineteenth Century to the Present

This course introduces the student to a certain number of general views on literature with particular attention to the following: the basic elements of a literary work (characters, story, plot, subjects, themes), the problems of interpretation, the intentions of the author and the perception of the

reader, the work in its various contexts: biographical, literary, sociological; the formal aspects typical of certain genres, particularly the drama and poetry. The texts illustrating these aspects in French-Canadian literature are selected within the period from Nelligan (nineteenth century) to the present day. Students taking this course will not be allowed to count French 20.268★ as part of the specific requirements for a Major or Honours degree in French.

Prerequisite: OAC in French, or equivalent.

Evening division: Three hours a week.

J. LeBlanc

French 20.181

Civilization

This course entails the study of a certain number of important elements of the culture and civilization of two French-speaking countries, alternatively French Canada and France: culture, customs, institutions, etc., with emphasis on the present situation. English may be used by the instructor.

Prerequisite: Permission of the Department.

Not offered 1990-91.

French 20.206★

Advanced Reading French

This course is designed to enable specialists from other departments to gain greater proficiency in reading technical texts in French. Readings of selected material from various fields and individual assignments in the student's specialization. The half credit gained from this course will not count as part of the specific requirements for a Major or Honours degree in French. No auditors.

Prerequisite: French 20.106★ or permission of the Department.

Day division: One and a half hours a week throughout the year.

S. Robinson

French 20.209

Techniques d'expression orale et écrite pour Non-Majors

Ce cours s'adresse à l'étudiant anglophone non-spécialisé en français et sert à approfondir la forme française de son expression orale et écrite. Partant de documents oraux et de textes non-littéraires, il enseigne les différentes manières d'organiser l'énoncé par des exercices variés, oraux et écrits. En plus de l'enrichissement du vocabulaire et du perfectionnement grammatical, le cours éclaire les principaux mécanismes de la langue.

Prerequisite: French 20.108, 20.111 or permission of the Department.

Day and Evening divisions: Three hours a week.

J.-J. van Vlasselaer and members of the Department.

French 20.210

Techniques d'expression écrite et orale pour journalistes

Ce cours, destiné aux étudiants en journalisme, insiste sur l'étude des éléments qui constituent les codes de la presse écrite et électronique, tout en examinant la presse francophone au Canada.

Prerequisite: French 20.108 or 20.110 or 20.111 or permission of the Department.

Day division: Three hours a week.

B. Burke

French 20.211

Techniques d'expression écrite et orale (A)

Ce cours prépare l'étudiant anglophone à partir de bases théoriques syntaxiques et textuelles à composer dans un

français soutenu, par l'emploi de mots précis, d'images et d'autres procédés. Initiation à l'argumentation et à la composition littéraire.

Etude de textes littéraires de diverses époques.

Prerequisite: French 20.111 or permission of the Department.

Day and Evening divisions: Three hours a week.

R. Fournier and members of the Department.

French 20.212

Techniques d'expression écrite et orale (B)

Ce cours destiné aux étudiants francophones comporte des objectifs similaires à ceux du cours French 20.211, mais s'inspire d'une méthode et d'ouvrages adaptés à leur niveau de compétence linguistique.

Prerequisite: French 20.112 or permission of the Department.

Day division: Three hours a week.

C. Dautrelept, O. Condemine

French 20.231

Initiation à la traduction

Comparaisons d'ordre grammatical, lexical et stylistique entre l'anglais et le français. Exercices de traduction de l'anglais au français visant l'expression et exercices de traduction du français à l'anglais visant la compréhension.

Prerequisite: French 20.111 or 20.112 or permission of the Department.

Day and Evening divisions: Three hours a week.

J. Miquet, S. Robinson, E. Voldeng

French 20.232★

Introduction à l'étude linguistique du français

Revue des éléments essentiels en recherche linguistique; application de ces éléments à la description et à l'analyse de la langue française; préparation aux différents cours de linguistique française offerts au département.

Prerequisites: French 20.111 or 20.112 and Linguistics 29.100 or permission of the Department.

Day division, Fall term: Three hours a week.

P. Laurette

French 20.233★

Phonétique et phonologie du français

Révision des notions fondamentales de la phonétique française. Organes de la parole. Phonèmes du français. Phonétique articulatoire et acoustique; phonétique combinatoire. Prosodie. Notions fondamentales de la phonologie du français. Les traits distinctifs du français.

Prerequisite: French 20.111 or 20.112 and Linguistics 29.100 or permission of the Department.

Day division, Winter term: Three hours a week.

R. Fournier

French 20.261★

La littérature du Moyen Âge

Introduction aux principaux courants de la littérature médiévale et approfondissement d'un ou plusieurs aspects de celle-ci par l'étude détaillée de certains textes représentatifs.

Prerequisite: French 20.161 or 20.162 or 20.163 or permission of the Department.

Day division, Fall term: Three hours a week.

J. Miquet

French 20.262★

La littérature du XVI^e siècle

Introduction aux théories de la Pléiade et aux aspects principaux de la littérature de la Renaissance, avec approfondissement de différents aspects de cette littérature

par l'étude détaillée de quelques textes.

Prerequisite: French 20.161 or 20.162 or 20.163 or permission of the Department.

Not offered 1990-91.

French 20.263★

La littérature du XVII^e siècle

Le classicisme et/ou le mouvement baroque dans la littérature française du XVII^e siècle, notamment le théâtre. Etude détaillée de plusieurs aspects de cette littérature dans un choix de textes représentatifs.

Prerequisite: French 20.161 or 20.162 or 20.163 or permission of the Department.

Evening division, Fall term: Three hours a week.

A. Elbaz

French 20.264★

La littérature du XVIII^e siècle

La fin du classicisme, le siècle de la raison, les Encyclopédistes et les Philosophes. Approfondissement d'un ou plusieurs aspects de cette littérature par l'étude détaillée de quelques textes.

Prerequisite: French 20.161 or 20.162 or 20.163 or permission of the Department.

Evening division, Fall term: Three hours a week.

S. Sarkany

French 20.265★

La littérature du XIX^e siècle

Introduction aux principaux courants de la littérature française du XIX^e siècle: Romantisme, Réalisme, Parnasse, Symbolisme. Etude plus détaillée d'un ou plusieurs de ces aspects dans un choix de textes représentatifs.

Prerequisite: French 20.161 or 20.162 or 20.163 or permission of the Department.

Evening division, Winter term: Three hours a week.

C. Dautrelept

French 20.266★

La littérature du XX^e siècle

Surviv de la littérature française moderne du Naturalisme au nouveau roman; l'unité et la diversité de cette littérature avec des exemples choisis parmi les textes représentatifs d'un ou plusieurs aspects les plus marquants. This course will not count as part of the specific requirements for a Major or Honours degree in French if taken in conjunction with French 20.162.

Prerequisite: French 20.161 or 20.162 or 20.163 or permission of the Department.

Day division, Winter term: Three hours a week.

A. Elbaz

French 20.267★

La littérature du XIX^e siècle au Canada français

Introduction aux principaux courants idéologiques et littéraires. Les débuts du roman et/ou de la poésie d'après quelques textes représentatifs.

Prerequisite: French 20.161 or 20.162 or 20.163 or permission of the Department.

Day division, Winter term: Three hours a week.

O. Condemine

French 20.268★

La littérature du XX^e siècle au Canada français

Evolution des principaux genres littéraires vue dans une optique sociale et esthétique. Le cours portera principalement sur l'époque contemporaine. This course will not count as part of the specific requirements for a Major or Honours degree in French if taken in conjunction with French 20.163.

Prerequisite: French 20.161 or 20.162 or 20.163 or permission of the Department.

Day division, Fall term: Three hours a week.

J. LeBlanc

French 20.280★

Civilisation de la France et de la francophonie

Etude d'un certain nombre d'éléments importants de la culture et de la civilisation de la France et de la francophonie: institutions, activité culturelle et intellectuelle, divers aspects de la vie actuelle.

Prerequisite: Permission of the Department.

Not offered 1990-91.

French 20.281★

Civilisation du Canada français

Etude d'un certain nombre d'éléments importants de la culture et de la civilisation du Canada français: institutions, activité culturelle et intellectuelle, divers aspects de la vie actuelle.

Prerequisite: Permission of the Department.

Not offered 1990-91.

French 20.282

Le théâtre: Théorie et pratique

Examen détaillé de plusieurs oeuvres théâtrales avec, pour objet, la préparation à des travaux pratiques (diction, interprétation théâtrale) et la participation à une ou plusieurs pièces présentées dans le cadre du cours.

Not offered 1990-91.

French 20.288

Contemporary English-Canadian and French-Canadian Literature

This course, which is offered by the French and the English departments, is designed for students who do not intend to select French as a Pass or Honours subject. It provides a general introduction to the two major literatures of Canada, and is taught in the two languages. (Also listed as Canadian Studies 12.288 and English 18.288.)

Precludes additional credit for French 20.188.

Prerequisite: A basic reading knowledge of French and Second-year standing.

Day division: Three hours a week.

French 20.310

L'écriture journalistique

Ce cours, destiné aux étudiants en journalisme, insiste sur l'analyse des mécanismes de l'écriture journalistique. L'étude des textes de nature différente (articles d'information, analyses, éditoriaux, reportages de fond, etc.) sera complétée par la rédaction d'articles sur l'actualité politique et autre.

Prerequisite: French 20.210 or permission of the Department.

Day division: Three hours a week.

French 20.312

Cours de grammaire descriptive

Etude de la langue française par une réflexion sur les structures de la langue et l'utilisation des grandes grammaires descriptives du français. Méthodologie de la recherche grammaticale, établissement de bibliographies et de corpus. Exercices pratiques. Cours commun aux étudiants anglophones et francophones.

Prerequisite: French 20.211 or 20.212 or permission of the Department.

Day division: Three hours a week.

R. Fournier

French 20.331

Principes et méthodes de la traduction

Initiation aux principes sous-jacents à la traduction, en particulier de l'anglais au français. Exercices pratiques s'appliquant à des textes non littéraires, souvent spécialisés (scientifiques, administratifs, commerciaux, etc.).

Prerequisite: French 20.231 or permission of the Department.

Evening division: Three hours a week.

J. Miquet

French 20.332

Français canadien

Histoire de la langue française au Canada; description de la phonétique, morphologie, syntaxe; le lexique: archaïsmes, anglicismes, canadianismes; variations sociales et régionales; problème de la norme.

Prerequisite: French 20.232★ or permission of the Department.

Day division: Three hours a week.

S. Robinson

French 20.333★

Histoire de la langue (A)

Etude phonétique, graphique, syntaxique et morphologique du Vieux français (XIIe siècle) et du Moyen français (XVe siècle), avec mise en valeur des phases intermédiaires pour les principaux aspects du langage.

Prerequisite: Permission of the Department.

Not offered 1990-91.

French 20.334★

Histoire de la langue (B)

Les transformations phonétiques, graphiques, morphologiques et syntaxiques les plus importantes du français de la Renaissance au français moderne.

Prerequisite: Permission of the Department.

Not offered 1990-91.

French 20.361

La Poésie

Le contenu précis de ce cours varie selon les années. Sujet pour 1990-91: Vue d'ensemble de la poésie romantique en France dans la première moitié du XIXe siècle. Cadre historique et social. Cadre littéraire: production et consommation littéraire, situation et pouvoir des écrivains. Le prérromantisme. La rupture romantique: influences étrangères, débats autour du mot "romantique". La poésie romantique: versification et thèmes. Oeuvres au programme: Lamartine, *Méditations poétiques*, Musset, *Poésies*, Vigny, *Poèmes antiques et modernes*, Gautier, *La Comédie de la mort*, Hugo, *Les contemplations*, *Les voix intérieures*.

Prerequisite: A course from the series French 20.261★ to 20.268★ or permission of the Department.

Evening division: Three hours a week.

C. Doutrelepon

French 20.362

Le Roman

Le contenu précis de ce cours varie selon les années. Sujet pour 1990-91: Le roman breton: Lais de Marie de France et Galeran de Bretagne. Les textes seront étudiés en vieux français.

Prerequisite: A course from the series French 20.261★ to 20.268★ or permission of the Department.

Day division: Three hours a week.

C. Doutrelepon, J. Miquet

French 20.363

Études littéraires

Le contenu précis de ce cours varie selon les années. Sujet pour 1990-91: L'essai au Canada français. Evolution et expression d'une pensée distinctive au Canada français. Choix d'œuvres représentatives des XIXe et XXe siècles. Prerequisite: A course from the series French 20.261★ to 20.268★ or permission of the Department.

Day division: Three hours a week.

M. Gaulin

French 20.364

Le Théâtre

Le contenu précis de ce cours varie selon les années.

Not offered 1990-91.

French 20.366★

Littérature et sciences humaines (I)

Le contenu précis de ce cours varie selon les années. Sujet pour 1990-91: Le théâtre moderne: scandale et levée d'interdit, spectacle et langage d'intervention. Le théâtre moderne est soit célébration soit protestation.

Prerequisite: A course from the series French 20.261★ to 20.268★ or permission of the Department.

Day division, Fall term: Three hours a week.

S. Sarkany

French 20.367★

Méthodologie et littérature (I)

Le contenu précis de ce cours varie selon les années.

Not offered 1990-91.

French 20.381

Aspects de la littérature canadienne-français

Le contenu précis de ce cours varie selon les années. Sujet pour 1990-91: L'écriture et la différence sexuelle dans quelques textes littéraires québécois. Voies d'approche et analyse de la spécificité masculine et féminine de l'écriture: utilisation de la forme littéraire, choix d'images et d'archétypes, langage et style des auteurs québécois d'hier et d'aujourd'hui, dont les suivants: Laura Conan, Claude-Henri Grignon, Germaine Guèvremont, Saint-Denis Garneau, Anne Hébert, Hubert Aquin, France Théoret.

Prerequisite: A course from the series French 20.261★ to 20.268★ or permission of the Department.

Evening division: Three hours a week.

P. Smart

French 20.431

Traduction littéraire

Traduction de l'anglais au français et du français à l'anglais de textes littéraires. Analyses de traductions déjà parues. Retraduction.

Prerequisite: French 20.231 or permission of the Department.

Not offered 1990-91.

French 20.432★

Morphologie et syntaxe du français

Grammaires modernes du français. Le cours a pour objet de familiariser les étudiants avec les grammaires modernes du français issues des derniers développements de la linguistique. On étudiera en particulier les systèmes grammaticaux.

Prerequisite: French 20.312 or permission of the Department.

Day division, Fall term: Two hours a week.

P. Laurette

French 20.433★

Sémantique et lexicologie du français

Les méthodes modernes de la sémantique appliquées à l'analyse des textes littéraires. Sémantique, lexicologie et lexicographie françaises. Le cours portera en outre sur l'évolution de la sémantique, le concept de sens et de signification, la détermination des significations, l'évolution des sens et ses lois et l'établissement du lexique et sa structuration.

Not offered 1990-91.

French 20.434★

Stylistique littéraire

Le cours est destiné à sensibiliser les étudiants aux procédés de l'expression littéraire et à les préparer à la critique stylistique. On étudiera en particulier les points suivants: la théorie du style littéraire, la fonction de la langue dans l'expression littéraire; la phonostylistique: utilisation des accents, des rythmes, des sons; la stylistique des mots: l'utilisation du vocabulaire, les effets affectifs, les effets par évocation; les translations figuratives: métaphores, métonymies, etc.; la stylistique de la phrase, etc.

Prerequisites: French 20.232★ and 20.233★ or permission of the Department.

Day division, Fall term: Two hours a week.

P. van Ruten

French 20.435

Linguistique appliquée: pédagogie de l'enseignement du français

Revue des notions de linguistique, de phonétique et de psycholinguistique se rapportant à l'apprentissage et à l'enseignement du français comme langue première et langue seconde. Etude des processus d'acquisition de la langue. Description de la langue pour la préparation à l'enseignement. Critique scientifique des méthodes et des méthodologies d'enseignement. Etude des relations entre les recherches sur la communication et l'apprentissage du français.

Prerequisite: French 20.232★ or permission of the Department.

Evening division: Two hours a week.

J.-J. van Vlasselaer

French 20.461

Littérature d'Idées (I)

Le contenu précis de ce cours varie selon les années. Sujet pour 1990-91: Jacques Godbout et la représentation de la société québécoise. Etude des romans, des articles et des films de l'auteur.

Prerequisite: A course from the series French 20.361 to 20.381 or permission of the Department.

Evening division: Two hours a week.

D. Smith

French 20.462

Littérature d'Idées (II)

Le contenu précis de ce cours varie selon les années. Sujet pour 1990-91: de l'omniscience à l'incertitude, les avatars du roman français des XIXe et XXe siècles. Etude de la transformation des conventions et procédés narratifs avec, à l'appui, quelques textes caractéristiques théoriques aussi bien que romanesques.

Prerequisite: A course from the series French 20.361 to 20.381 or permission of the Department.

Day division: Two hours a week.

E.N. Zimmerman

French 20.463★

Aspects de la littérature française (I)

Le contenu précis de ce cours varie selon les années. Sujet pour 1990-91: La Pléiade: théorie et pratique. Etude de ce mouvement d'une importance capitale, qui fut à l'origine du renouvellement de la littérature française au XVI^e siècle. Parmi les textes au programme: les poèmes de Pierre de Ronsard et de Joachim du Bellay, le théâtre d'Etienne Jodelle.

Prerequisite: A course from the series French 20.361 to 20.381 or permission of the Department.

Evening division: Fall term: Two hours a week.

P. Clive

French 20.464★

Aspects de la littérature française (II)

Le contenu précis de ce cours varie selon les années. Not offered 1990-91.

French 20.466★

Littérature et sciences humaines (II)

Le contenu précis de ce cours varie selon les années. Not offered 1990-91.

French 20.467★

Méthodologie et littérature (II)

Le contenu précis de ce cours varie selon les années. Not offered 1990-91.

French 20.468★

Aspects de la littérature canadienne-française I

Le contenu précis de ce cours varie selon les années. Sujet pour 1990-91: les romanciers du mouvement littéraire de 1860 au Canada français. Ce cours se propose d'étudier les romans les plus représentatifs du mouvement littéraire de 1860, qui font ressortir les aspirations d'ordre idéologique et national de cette époque. Auteurs au programme: P.J. Chauveau, Napoléon Bourassa, Philippe Aubert de Gaspé, Joseph Taché.

Prerequisite: A course from the series French 20.361 to 20.381 or permission of the Department.

Day division, Winter term: Two hours a week.

O. Condemine

French 20.469★

Aspects de la littérature canadienne-française II

Le contenu précis de ce cours varie selon les années. Sujet pour 1990-91: la narratologie définie comme une "science du récit" dont le principal objet est de décrire la structure de textes littéraires. Dans cette optique, la narratologie privilégie certains éléments susceptibles d'être repérés dans toute oeuvre: le narrateur, la temporalité, la spatialité, la perspective narrative, l'ordre des événements racontés, etc. Le premier but de ce cours sera de décrire ces divers procédés à partir des écrits théoriques. Il s'agira ensuite d'examiner la mise en place de ces différents procédés dans quelques romans québécois contemporains.

Prerequisite: A course from the series French 20.361 to 20.381 or permission of the Department.

Day division, Fall term: Two hours a week.

J. LeBlanc

French 20.482

Initiation à la recherche

Comment et où effectuer des recherches pour l'étude d'une oeuvre, d'un auteur ou d'un thème. Les sources bibliothécaires et autres. Travaux pratiques: établissement de bibliographies, de fiches, d'une édition critique, etc.

Prerequisite: Permission of the Department.

Not offered 1990-91.

French 20.483

Tutorial

Prerequisite: Permission of the Department.

French 20.484★

Tutorial

Prerequisite: Permission of the Department.

Graduate Courses Open to Undergraduates

(With permission of the Department)

French

- 20.502★ Linguistique du français I
- 20.503★ Linguistique du français II
- 20.504★ Linguistique du français canadien
- 20.506★ Linguistique du français langue seconde
- 20.507★ Traduction: théorie et pratique
- 20.541★ Sémiotique littéraire
- 20.542★ Littérature et rhétorique
- 20.543★ Littérature et idéologie
- 20.544★ Auteurs
- 20.545★ Thèmes, écoles, mouvements
- 20.546★ Genres I
- 20.547★ Genres II
- 20.548★ Littérature française I
- 20.549★ Littérature française II
- 20.550★ Littérature canadienne-française I
- 20.551★ Littérature canadienne-française II
- 20.561★ Sémiotique culturelle
- 20.562★ Littérature, société, communication
- 20.563★ Littérature et les autres arts
- 20.570★ Aspect littéraire culturel particulier

Courses Planned for Evening Division

An effort will be made to offer as wide a selection as possible of courses in the Evening division of the Winter session over the next four years.

Loeb Building, Room B349
Telephone: 788-2561

Officers of Instruction

Chairman
M.F. Fox

Supervisor of Graduate Studies
A.I. Wallace

Supervisors of B.A. Studies
J. Clarke (*Honours*)
F. Mackenzie (*Pass*)

Supervisor of B.Sc. Studies
M.W. Smith

Professors
J. Clarke
J.P. Johnson, Jr.
D.B. Knight
D.M. Ray
D.R.F. Taylor (*Joint appointment, Carleton International*)
J.K. Torrance
P.J. Williams

Associate Professors
D.M. Anderson
D. Bennett
M.F. Fox
M.W. Smith
J.E. Tunbridge
A.I. Wallace
T.P. Wilkinson

Assistant Professors
F. Mackenzie
S. Mackenzie
G. Ozornoy

Instructor
D. Patterson

Map Librarian
B.E. Farrell

Geotechnical Science Laboratories
L. Boyle
A. Pendlington

Hardware/Software Co-ordinator
S. Prashker

Cartographer
C.E. Earl

Adjunct Research Professors
G. Decker
A. Judge
R.M. Koerner
E.W. Manning
A. Rencz
W. Smith
G.D. Taylor

General Information

The Department of Geography has programs of study leading to the following Degrees: B.A. (Pass), B.A. (Honours), B.Sc. (Honours), and M.A. A special concentration in Geographic Information Processing (GIP) is available under the B.A. (Honours) program. In addition, informal concentrations can be developed (with particular reference to Canada and parts of northern lands, and the Third World) in: urban studies; regional development; economic geography; resource and land-use planning; cultural, historical and political geography; physical geography and environmental management. Geographic skills are developed in areas such as: air photo interpretation; remote sensing; traditional and computer cartography and data processing. A mixture of classroom, laboratory, seminar and field studies is used in the program.

It is also possible to complete joint B.A. Pass and Honours programs between Geography and many Arts and Social Science disciplines, including Law, Economics, History, Anthropology, Psychology, Political Science, Canadian Studies, Sociology, Journalism and Biology. There is also a Combined Honours Geography and Biology program. Even without the formality of a Combined program it is possible for those pursuing a single Pass or Honours program in Geography to develop a subsidiary thematic or regional concentration by taking a variety of non-geography electives. Please contact the Department of Geography for information about these possibilities.

Entry into Upper-Level Courses

Courses are normally taken in the year corresponding to the first digit in the course numbers. However, a Third-year student may take 400-level courses provided the student has the necessary prerequisites, a Geography grade-point average high enough for entry into Honours and permission of the Department. Students without the formal prerequisites for courses may take Geography courses with permission of the Department.

Fourth-year Honours students may include one half credit at the 500 level towards their Honours degree only if they have a B+ grade-point average in Geography, appropriate background courses and the written permission of the Graduate Supervisor and the instructor of the course.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

B.A. Pass Programs

Pass Program in Geography

This program is offered for students who wish a liberal arts education with emphasis in geography. Guidance on patterns of courses for particular interests is available from the Department.

Students admitted to the Pass Program in Geography are required to complete the equivalent of at least seven credits and normally not more than nine credits in Geography, which must include:

1. A full credit in Geography at the 100 level. Geography 45.101 is recommended;
2. Geography 45.204, 45.210★ (or 45.211★), 45.220★, 45.230★;
3. at least three and a half additional Geography credits, of which two and a half must be at the 300 level or 400 level.

Combined Pass Programs

Students admitted to a Combined Pass Program in Geography and another department are required to complete the equivalent of at least five credits and normally not more than seven credits in Geography, which must include:

1. A full credit in Geography at the 100 level. Geography 45.101 is recommended;
2. two of Geography 45.210★ (or 45.211★), 45.220★, 45.230★;
3. at least three additional Geography credits; of which at least one and a half must be at the 300 level.

B.A. Honours Programs

The Honours program in Geography is offered for students who wish to prepare for graduate study, a career in planning, government, business, or other specialization in which the field of geography offers the appropriate training. Information on recommended patterns of courses related to various interests is available from the department. There is substantial freedom in the program for students to take courses of special interest in the University, as well as courses in geography and related disciplines.

A formal concentration is offered in Geographic Information Processing, for students who wish to focus on the acquisition, management, display and use of geographic information. Students will be involved with microcomputer-based techniques of data management and display and with various applications in planning, environmental and resources management, and demographics.

Students reading for an Honours degree must satisfy the general Faculty regulations for Honours (pp. 59-64). Fourth-year Honours students may take one half credit listed in the Graduate Studies and Research Calendar only if they have a B+ grade-point average in Geography and permission of the Department.

Honours in Geography

Students admitted to the Honours Geography program are required to complete the equivalent of 20 credits beyond Senior Matriculation or Qualifying University year in Arts or Social Sciences. The equivalent of at least 11 credits and normally not more than 13 credits must be in Geography and must include:

1. A full credit in Geography at the 100 level. Geography 45.101 is recommended;
2. Geography 45.204, 45.210★ (or 45.211★), 45.220★, and 45.230★;
3. either (i) Geography 45.491★ and 45.492★ or (ii) 45.499;
4. at least six and a half additional Geography credits, of which at least three must be at the 300 level and at least two must be at the 400 level.

Combined Honours

Students taking Combined Honours in Geography and another subject are required to complete the equivalent of at least seven credits and normally not more than nine credits in Geography which must include:

1. A full credit in Geography at the 100 level. Geography 45.101 is recommended;
2. two of Geography 45.210★ (or 45.211★), 45.220★, 45.230★;
3. Geography 45.204;
4. at least three additional Geography credits, two at the 300 level and one at the 400 level.
5. either (i) Geography 45.491★ and 45.492★, or Geography 45.499 or (ii) an Honours research essay or equivalent in the other Honours department and an additional Geography credit at the 400 level.

B.A. Combined Honours in Biology and Geography
For Geography requirements see above; for Biology requirements see pp. 75-76. Students must contact both departments for advice.

Honours in Geography with a Concentration in Geographic Information Processing (GIP)

Admission to this program is dependent on the student attaining a minimum grade-point average in specified courses. Admission will not normally be considered until three full credits in Geography have been completed, which *must include* at least 1.0 credit in the GIP core courses listed below. In addition to Honours standing in Geography, the student must attain a minimum grade-point average of 6.5 in the GIP course(s). Further, candidates must attain a minimum grade point average of 6.5 in the GIP core courses listed below in order to graduate with the concentration.

Students taking this concentration are required to take the following courses:

1. A full credit in Geography at the 100 level;
2. Geography 45.210★ (or 45.211★); 45.220★ and 45.230★;
3. 5.5 credits in Geographic Information Processing as follows: 45.204, 45.302★, 45.303★, 45.304, 45.307★, 45.403★, 45.406★, 45.408★, 45.446★ (with placement in a GIP-related setting);
4. 1.5 additional credits in Geography at 200 level or higher;
5. An additional half credit in Geography at the 300 level or higher;
6. Geography 45.491★/492★ or 45.499, with an emphasis on the nature and/or use of Geographic Information Processing;

B.Sc. Honours Programs

Honours B.Sc. in Geography

The Bachelor of Science Honours program in Physical Geography is designed to give the student an understanding of the earth's surface as man's physical environment. The student will specialize in the study of properties and processes of the earth's surface materials and atmosphere.

Undergraduate Courses in Geography

45.101	Geographic Web	45.102★ Contemporary Issues I	45.103★ Contemporary Issues II	45.105 Earth Science
45.210★ Physical Environment 45.211★ Environmental Management	45.204 Information and Analysis	45.220★ Global Economy 45.221★ Contemporary Economies	45.230★ Cultural-Landscape 45.231★ Cultural-Political	
45.311★ Biophysical 45.312★ Geomorphology 45.315★ Climatology 45.318★ Soils 45.319★ Soils	45.302★ Air Photos 45.303★ Quantitative Methods 45.304 Information Processing 45.307★ Cartographic Theory 45.309★ Cartographic Production	45.320★ Canadian City 45.327★ Quality of Life 45.329★ Development 45.333★ Planning 45.334★ Planning 45.341★ Regional Economies 45.370★ Population	45.330★ Africa 45.351★ Northlands 45.355★ Canada 45.360★ U.S.R. 45.361★ Eastern Europe 45.395★ Selected Region	45.335 Historical 45.337★ Political 45.374★ Law
45.402★ Problems Tutorial 45.405★ Environment 45.411★ Quaternary 45.412★ Terrain analysis 45.413★ Hydrology 45.414★ Microclimatology 45.415★ Earth Materials 45.417★ Soil Mechanics 45.418★ Geocryology	45.400★ Field Studies 45.403★ Remote Sensing 45.408★ Cartography 45.409★ Geographic Information Systems 45.490★ Methodology	45.401★ Problems Tutorial 45.404★ Environmental Assessment 45.405★ Environmental Assessment 45.423★ Urban Revitalisation 45.425★ Equality 45.426★ Health, Environment and Society 45.427★ Urban Planning 45.433★ Urban Development 45.434★ Transport 45.442★ Transport 45.444★ Recreational 45.445★ Land Resource Use 45.446★ Practicum	45.401★ Problems Tutorial 45.431★ Cultural 45.435★ Historical 45.440★ Political	
45.491★ & 45.492★	Research Project Design and Report	45.496	Honours Research Project	45.499 Honours Research Essay

★ denotes half-credit course, usually given in one term

The program consists of 20 credits beyond Senior Matriculation or Qualifying University year Science, selected in a pattern approved by the Supervisor of Honours Studies in the Department of Geography, and consistent with the following requirements:

1. The First year of the program will be consistent with Faculty of Science requirements for First-year Science. (Note that Physics 75.100 or 75.105 is required in Second year if not taken in First year.)

2. The program will contain eight credits in Geography at or beyond the 200 level, including the Honours Research Project, Geography 45.496, which should be taken in the final year; and seven credits selected from the list below, of which at least two must be at the 300 level and at least two at the 400 level. These should include Geography 45.210★, 45.211★, 45.311★, 45.312★, 45.315★ and 45.318★. In special cases students may take an appropriate graduate course in their final year, with permission of the Supervisor of Graduate Studies.

3. The remaining seven credits must include:

- (a) two approved credits in Science, not in Geography, beyond the 100 level (Geology 67.233★ and 67.281★ are recommended);
- (b) two approved credits in Science, Computer Science or Engineering;
- (c) two Arts or Social Science electives, one of which must be an approved credit not in Geography;
- (d) one free elective.

Physical Geography Courses

- 45.105 Introduction to Geoscience
- 45.204 Geographic Information and Analysis
- 45.210★ The Physical Environment
- 45.211★ Physical Basis of Environmental Management
- 45.302★ Air Photo Interpretation and Remote Sensing
- 45.303★ Quantitative Geography
- 45.304 Geographic Information Processing
- 45.307★ Cartographic Theory and Design
- 45.309★ Cartographic Production
- 45.311★ Biophysical Resource Assessment
- 45.312★ Geomorphology
- 45.315★ Physical Climatology and Climatic Change
- 45.318★ Soil Properties
- 45.319★ Soils and Environment
- 45.400★ Field Studies
- 45.402★ Problems in Physical Geography
- 45.403★ Remote Sensing of the Environment
- 45.404★ Environmental Impact Assessment
- 45.405★ Field Studies in Environmental Assessment
- 45.408★ Geographic Information Systems
- 45.411★ Quaternary Geography
- 45.412★ Terrain Analysis
- 45.413★ Hydrology
- 45.414★ Microclimatology
- 45.415★ Earth Surface Materials
- 45.417★ Introductory Soil Mechanics and Engineering Geology
- 45.418★ Geocryology

A recommended program is:

First Year

Mathematics 69.107★ and 69.117★;
Geography 45.105
two of: Biology 61.102 or 61.209★ and 61.230★, Chemistry 65.100, Physics 75.100 or 75.105.
Arts or Social Science elective.

Second Year

Geography 45.204;
one of: Geography 45.210★ and up to one full credit from the 300 level from the preceding list of approved Physical Geography courses;
Mathematics 69.257★;
Science elective or Physics 75.100 or 75.105 (required course in Second year if not taken in First year);
Arts or Social Science elective.

Third Year

Geography 45.311★ or 45.312★, 45.302★;
either Geography 45.315★; or 45.318★ with an additional half credit from the preceding list of approved Physical Geography courses;
one 400-level Geography credit;
one Science Continuation credit;
Arts or Social Science elective.

Fourth Year

Three 400-level Geography credits (including 45.496);
one Science Continuation credit;
free option.

Note:

A Human Geography course is recommended as one of the Arts or Social Science electives.

Combined Honours B.Sc. in Biology and Physical Geography

Program advisers are H.G. Merriam and P.J. Williams.

Students desiring a comprehensive basic education in both Biology and Physical Geography may apply to a Combined Honours B.Sc. program. Applicants must satisfy entry requirements of the Honours B.Sc. program. Course requirements of the Combined Honours B.Sc. program are as follows:

1. Biology 61.209★ and 61.230★, Geography 45.105, Mathematics 69.107★ and 69.117★, Chemistry 65.100.
2. Two optional credits that are acceptable courses offered by the Faculties of Arts or Social Sciences. A credit in Geography, other than the Physical Geography courses on pp. 136-137, is recommended.
3. One additional Science credit from the list on p. 347 (Physics 75.100 or 75.105 is required unless Grade 13 Physics is presented as an entrance credit).
4. One free option credit (unless Biology 61.102 is offered in lieu of the Ontario Academic Credit in Biology. See Biology program for entry with and without Ontario Academic Credit in Biology).
5. Ten credits in Biology (or Biochemistry) and Physical Geography (see course list on this page) beyond First-year level, including at least one half credit involving a field course. Not more than six credits in this group should be taken in one department and not more than six may be at the 200 level.
6. One additional credit in Science or Computer Science above the 100 level, not in Biology or Geography and chosen in consultation with the student's program adviser.
7. Biology 61.498 or Geography 45.496.

Combined Honours B.Sc. in Geology and Physical Geography

Program advisers are F. Michel and P.J. Williams.

A grade of C+ or better in Geography 45.105/Geology 67.105 and overall Honours standing are required for ad-

mittance to the program. Program requirements are as follows:

1. Geography 45.105 or Geology 67.105†, Chemistry 65.100, Mathematics 69.107★ and 69.117★ and Physics 75.100 or 75.105;

2. Five credits in Geology beyond First-year level, including 67.221★, 67.228★, 67.233★, 67.281★††, one half credit in Geology at the 200 level or above, (students should choose this one-half credit with future course prerequisites in mind), one and a half credits in Geology at the 300 level or above, and one credit in Geology at the 400 level;

3. Five credits in Physical Geography beyond First-year level from list on p. 138, to include: Geography 45.210★, one credit in Physical Geography at the 200 level or above, Geography 45.302★, 45.312★, 45.315★, 45.318★ and one credit in Physical Geography at the 400 level;

4. Geography 45.496 or Geology 67.498;

5. One credit in Mathematics beyond First-year level and/or Computer Science. (Mathematics 69.257★ and Computer Science 103★ are recommended.)

6. Two Arts or Social Science elective credits†††;

7. Two credits chosen from Arts, Social Science, Science or Engineering.

† Students who have taken Geology 67.100 may substitute, with permission of the program advisers, Geology 67.100 for 67.105/45.105.

†† Geology 67.281★ precludes additional credit for Geography 45.299★, no longer offered.

††† A Human Geography course is recommended in the program.

Graduate Programs

The Department of Geography offers graduate programs in human geography, physical geography and geotechnical science. For further details consult the Graduate Studies and Research Calendar.

Courses Offered

Not all courses are offered every year. Details of courses offered in 1990-91 can be obtained from the Department of Geography.

Geography 45.101

The Geographic Web

Introduces the major themes of geographic analysis, focusing (1) on the interdependencies between societies and their natural environments, and (2) on the social, economic, cultural and political forces that are reflected in the spatial distributions of human activity at scales ranging from the international to the local. Methods of acquiring and interpreting geographical information are reviewed.

Section A: Lectures and practical work/discussion three hours a week; Section B: Tutored modules, self-paced, three hours a week.

Geography 45.102★

Contemporary Issues: Environment, Resources and Society

Examination of the variety of geographic factors operating in the contemporary world, emphasizing global and regional

issues in which environmental, economic geography and resource problems are crucial; organized around a series of themes which include global climatic change, desertification, global food problems, the geographic impact of declining oil supply, and the world oceans — changing conditions and role.

Lectures three hours a week.

Geography 45.103★

Contemporary Issues: Territory, Culture and Political Space

Examination of the variety of geographic factors operating in the contemporary world, emphasizing global and regional issues in which political and cultural geography is central; organized around a series of themes including colonial linkages to Third World development, metropolitan dominance and "mini-states," diffusion of technology and values, territorial integration and fragmentation.

Lectures three hours a week.

Geography 45.105

Introduction to Geoscience

A survey of processes operating within the Earth and at its surface: the hydrologic cycle, oceans, earth structure, tectonics, rocks, minerals, history of life on the earth, climatic change, soils, landforms and resources. This course is designed for students who wish to understand the physical environment of the planet they inhabit. (Also listed as Geology 67.105.)

Precludes additional credit for Geology 67.100.

Day division: Lecture three hours a week, laboratory three hours a week, a field excursion.

Geography 45.204

Geographic Information and Analysis

Examines the characteristics, utility, analysis, presentation, and geographic application of information derived from field-work, maps, statistical and literary sources, remotely sensed imagery, and geographic information systems. An integrated micro-computer orientated approach is emphasized, paying particular attention to graphic and cartographic design, and exploratory and inferential statistical procedures. Includes a required residential field camp of approximately one week duration.

Prerequisite: A full credit in Geography at the 100 level.

Note: Restricted to students in Geography Honours, Combined Honours or Pass programs: not available to students in Geography Combined Pass programs.

Lectures two hours a week, laboratory two hours a week.

Geography 45.210★

The Physical Environment

The physical geography of natural environments, emphasizing the kinds of earth materials, their properties, and the processes that act upon them.

Prerequisite: A full credit in Geography at the 100 level, or a First-year science course.

Lectures two hours a week, laboratory three hours a week.

Geography 45.211★

Physical Basis of Environmental Management

The use and management of the physical environment, with an emphasis on the climate, water, land and soils of the local region. Regional environmental concerns are examined with reference to public hearings and municipal meetings.

Prerequisite: A full credit in Geography at the 100 level, or Second-year standing.

Lectures two hours a week, laboratory three hours a week.

Geography 45.220★

Geography of the Global Economy

An overview of the global economy, focusing on the geographical pattern of its evolution and its resource base. Theories of spatial relationships at various scales, including the development of core-periphery contrasts, national urban systems and regional specializations in agriculture and industry.

Prerequisite: A full credit in Geography at the 100 level, (Geography 45.101 is recommended) or Second-year Standing.

Lectures and discussion three hours a week.

Geography 45.221★

Geographical Challenges of Contemporary Economies

Geographical analysis of problems facing modern economies, within different political frameworks and at varying levels of technological development. Includes provision of food and energy supplies, the activity of multinational corporations, policies to combat regional economic disparities and problems of growth and change in urban areas.

Prerequisite: Geography 45.220★ is recommended.

Lectures and discussion three hours a week.

Geography 45.230★

The Cultural Landscape

Examination of ways people varying create, modify and interact with the physical environment. Emphasis is placed on the roles of attitudes, ideas, behaviour and organizational structures, as well as contrasting perceptions of environment.

Prerequisite: A full credit in Geography at the 100 level, (Geography 45.101 is recommended) or Second-year standing.

Lectures and discussion three hours a week.

Geography 45.231★

Conflict and Accord in the Modern World

The role of boundaries, especially cultural and political; the meanings given to space, with emphasis on their impact on development processes and on ethnic and international conflict; culture area, cultural ecology and plural societies.

Prerequisite: Geography 45.230★ is recommended.

Lectures and discussion three hours a week.

Geography 45.302★

Air Photo Interpretation and Remote Sensing

Introduction to the techniques of air photo interpretation, remote sensing of the environment and elements of photogrammetry.

Precludes additional credit for Geography 45.202★ (no longer offered).

Prerequisite: Geography 45.204 or permission of the Department.

Lectures two hours a week, laboratory two hours a week.

Geography 45.303★

Quantitative Geography

Multiple-regression and factor analytic techniques as applied to problems of classification, regionalization, explanation and hypothesis testing in geographical research. Various taxonomic algorithms are examined and an introduction to geographical models is provided.

Prerequisites: Geography 45.204 and enrolment in a Geography degree program or permission of the Department.

Lectures and laboratory three hours a week.

Geography 45.304

Geographic Information Processing

The acquisition, manipulation, and display of spatially referenced information by means of micro-computers. The principles, design and application of spatial information systems

for environmental and socio-economic data bases; concepts of computer-assisted cartography; and the use of micro-computer-based mapping systems.

Prerequisites: Geography 45.204 and Honours standing in Geography. (Concurrent registration in Geography 45.307★ is recommended).

Lectures two hours a week, practical two hours a week.

Geography 45.307★

Cartographic Theory and Design

Principles of cartography, cartographic communication and map design. The course includes practical work designed to provide experience in solving problems of cartographic representation.

Precludes additional credit for Geography 45.324★ and 45.325, no longer offered.

Prerequisites: Geography 45.204 and Third-year standing, or permission of the Department.

Lectures and practical three hours a week.

Geography 45.309★

Cartographic Production

Principles of design and production used by professional cartographers. Each student produces a multi-colour thematic map using state-of-the-art map-making operations.

Precludes additional credit for Geography 45.325★ and 45.325, no longer offered.

Prerequisites: Geography 45.204, 45.307★ (or concurrent enrolment) and Third-year standing or permission of the Department.

Lectures two hours a week, laboratory three hours a week.

Geography 45.311★

Biophysical Resource Assessment

The acquisition and interpretation of biophysical information, with regard to defining limitations on the use of the environment. The course includes instruction in field techniques and the use of microcomputer-based systems for compiling databases and maps for examining land capability and environmental constraints.

Prerequisite: Geography 45.210★ or 45.211★. Geography 45.204 is recommended.

Lectures/laboratory/fieldwork five hours a week.

Geography 45.312★

Geomorphology

Geomorphological agents of landscape change at the earth's surface, emphasising the role of water, ice and wind in erosion and deposition; use of geomorphic indicators in studies of environmental change.

Prerequisites: For B.Sc. students: Geography 45.210★; for B.A. students: Geography 45.210★ and Third-year standing or permission of the Department.

Lectures two hours a week; laboratory three hours a week.

Geography 45.315★

Climatology and Climatic Change

An understanding of global climatic patterns in terms of radiation and energy exchange, the hydrologic cycle and atmospheric circulation; mechanisms of climatic change; recent climatic history and contemporary issues of climatic change; climate impact assessment.

Precludes additional credit for Geography 45.345★, no longer offered.

Prerequisite: Geography 45.210★ or permission of the Department. Students should also have taken Geography 45.204, or have equivalent knowledge of microcomputers.

Lecture/laboratory five hours a week.

Geography 45.318★

Soil Properties

The physical and chemical properties of soils; soil-water relationships, weathering processes, soil mineralogy, cation exchange, soil pH. A plant-oriented perspective predominates.

Precludes additional credit for Geography 45.308, no longer offered.

Prerequisite: Geography 45.105, or 45.210★, or permission of the Department.

Lectures/laboratory five hours a week.

Geography 45.319★

Soils and Environment

The formation and development of soils, soil classification, soil fertility, soils and environmental concerns, land degradation.

Precludes additional credit for Geography 45.308, no longer offered.

Prerequisite: Geography 45.318★ or permission of the Department.

Geography 45.320★

The Canadian City: Internal Structure and Contemporary Problems

The internal structure of the Western city with explicit application to Canadian cities; current urban problems and their attempted resolutions, with particular focus on: inner city revitalization and peripheral expansion, movement toward metropolitan organization of the city; evolving transportation systems and their interaction with land use.

Prerequisite: Geography 45.220★ or permission of the Department.

Lectures three hours a week.

Geography 45.327★

Measuring the Quality of Life

Examines the philosophies, methodologies and techniques that define and describe the place-to-place variations in socio-economic environments.

Precludes additional credit for Geography 45.425★, no longer offered.

Prerequisite: Geography 45.303★. Concurrent registration in Geography 45.304 is recommended.

Lecture two hours a week, laboratory/workshop two hours a week.

Geography 45.329★

Sustainable Development and Third World Environments

In light of theories of development and underdevelopment, and in the context of environmentally sustainable development, issues such as land degradation, deforestation, agricultural productivity, climatic change, energy supplies and urban growth are examined at scales ranging from the intra-household and local to the international.

Prerequisite: Geography 45.220★ or 45.230★ or 45.231★ or permission of the Department.

Lectures three hours a week.

Geography 45.330★

Sustainable Development in Sub-Saharan Africa

A historical analysis of contemporary problems faced by selected states in sub-Saharan Africa, focusing on the question of environmental sustainability in the context of political, social and economic change. Issues are discussed at scales ranging from the intra-household and local to national.

Prerequisite: Third-year standing or permission of the Department.

Lectures three hours a week.

Geography 45.333★

Municipal Land-Use Planning in Canada

The rationale for, evolution of, and cultural influences on land use and land-use planning; the powers and roles of governments and other actors, including the public, in the municipal planning process, with the chief emphasis on Ontario. Selected land-use planning issues from various provinces related to environmental, watershed, agricultural, redevelopment and heritage concerns.

Prerequisite: Third-year standing or permission of the Department.

Lectures two hours a week, one hour discussion group.

Geography 45.334★

Renewable Resource Planning in a Local Area

A planning-oriented examination of a local river basin, aimed at developing a co-ordinated plan for renewable resource management, utilizing existing local, regional and watershed legislation in Ontario. Students work in project teams, under supervision, to develop a practical plan for land use, water resource management, urban development, recreational space and environmental preservation.

Prerequisite: Third-year standing or permission of the Department. Geography 45.333★ is recommended.

Lectures, discussion and project work three hours a week.

Geography 45.335

Historical Geography of Canada

Canada from pre-history to the present. The course addresses issues of culture and economy in a geographical context. Methodology in historical geography is examined.

Prerequisite: Geography 45.230★ or History 24.230 or 24.231 or permission of the Department.

Lectures three hours a week.

Geography 45.337★

Systematic Political Geography

A systematic analysis of political structures, processes and behaviour from a geographic perspective through examination of the "classical" works in political geography and current literature.

Prerequisite: Geography 45.103★ or 45.231★ or permission of the Department.

Lectures three hours a week.

Geography 45.340★

The Location of Industry and Public Services

Theories of industrial location and of the geographical behaviour of business corporations. Geographical decision making in the public sector, especially in urban areas.

Prerequisite: Geography 45.220★ or permission of the Department.

Lectures three hours a week.

Geography 45.341★

Geographical Analysis of Regional Economies

Examination of the various bases for regional economic development, including resource endowment, relative location and the significance of external influences. Relationships between economic structure and spatial structure at various scales. Issues of theory and policy are both addressed.

Prerequisite: Geography 45.220★ or permission of the Department.

Lectures and discussion three hours a week.

Geography 45.351★

Northern Lands

An analysis of the physical characteristics, historical geography, economic resources, settlement patterns and problems and the future development of Arctic and Sub-

arctic lands, focusing primarily on Canada.

Prerequisite: Third-year standing or permission of the Department.

Lectures three hours a week.

Geography 45.355★

Canada: Contemporary Geographic Issues

Analysis and interpretation of Canada, its regions and localities, using a range of geographical concepts. The focus is on the interactions among society, the economy and the environment, and related policy issues.

Precludes additional credit for 45.305★, no longer offered.

Prerequisite: Third-year standing or permission of the Department.

Lectures three hours a week.

Geography 45.360★

The U.S.S.R.: A Geographic Survey

A general review of the physical, social and economic geography of the Soviet Union, with detailed analyses of selected topics related to social and population conditions, resources development and environmental problems, including comparisons with North America.

Prerequisites: Third-year standing.

Offered in alternate years to Geography 45.361★

Lectures three hours a week.

Geography 45.361★

Eastern Europe: A Geographic Survey

A general review of the physical, social and economic geography of Eastern Europe, with detailed analyses of selected topics related to social and population conditions, resources development and environmental problems, including comparisons with North America.

Prerequisites: Third-year standing.

Offered in alternate years to Geography 45.360★.

Lectures three hours a week.

Geography 45.370★

Population Geography

Studies of the distributional aspects of population attributes. The areal patterns of population characteristics and their spatial variations associated with differences in the nature of places are examined. Migratory movements are considered within the framework of spatial models of interactions between locations.

Prerequisite: Either Geography 45.230★ or 45.220★ or permission of the Department.

Lectures three hours a week.

Geography 45.374★

Local Government Law

Offered in the Department of Law as Law 51.374★.

Geography 45.395★

Selected World Regional Problems

Geographical analysis of topical problem areas in the world community.

Prerequisite: Third-year standing or permission of the Department.

Lectures three hours a week.

Geography 45.400★

Field Studies

Field observation and methodology in a selected region; individual or group basis.

Prerequisite: Permission of the Department.

Day or Evening division, Fall or Winter terms: Hours to be arranged.

Geography 45.401★

Problems in Human Geography

A course designed to permit a student to pursue his or her interests in a selected field of human geography. The student prepares papers for discussion with the tutor.

Normally only one half credit in Geography 45.401★ may be presented for the degree and additional credit for Geography 45.402★ is precluded.

Prerequisites: Final-year Honours standing and permission of the Department (by special arrangement only).

Day division, Fall or Winter term: Hours to be arranged.

Geography 45.402★

Problems in Physical Geography

A course designed to permit a student to pursue his or her interests in a selected field of physical geography. The student prepares papers as the basis for discussion with the tutor.

Normally only one half credit in Geography 45.402★ may be presented for the degree and additional credit for Geography 45.401★ is precluded.

Prerequisites: Final-year Honours standing and permission of the Department (by special arrangement only).

Day division, Fall or Winter term: Hours to be arranged.

Geography 45.403★

Remote Sensing of the Environment

The recording of earth features from suborbital and orbital altitudes and applications to the study of natural and man-made environments. Interpretation and geometry of the air photo; technical aspects include the electro-magnetic spectrum, active and passive sensors, sensor platforms, and visual and digital image analysis; practical applications are explored in such areas as agriculture, forestry, corridor mapping, hydrology, urban analysis and regional planning, and northern environments.

Prerequisites: Geography 45.302★ and Honours standing or permission of the Department.

Lectures two hours a week, laboratory two hours a week.

Geography 45.404★

Environmental Impact Assessment

An examination of the principles, scope and purpose of environmental impact assessment, from conceptual and methodological points of view. A range of environmental issues is examined through class seminars, field trips and a field-based student project.

Prerequisite: Fourth-year Geography Honours standing or, for non-Geography students, permission of the Department. 45.311★ is recommended.

Lectures and seminars three hours a week.

Geography 45.405★

Field Studies in Environmental Assessment

A project-oriented course in which students apply the principles and methods of environmental assessment to a selected development proposal.

Prerequisite: Geography 45.404★ or permission of the Department.

Four hours a week.

Geography 45.406★

Selected Topics in Cartography

Specialised themes in cartography, selected to reflect faculty interests. The theme for 1990-91 is computer-assisted cartography.

Prerequisites: Geography 45.307★ and permission of the Department.

Lectures three hours a week.

Geography 45.408★

Geographic Information Systems

The input, storage, retrieval and use of spatially referenced information applied to selected case studies and problems. The course is intended to give students a working knowledge of a micro-computer-based geographic information system. Prerequisites: Geography 45.304 and Honours standing in Geography.

Lectures two hours a week, practical two hours a week.

Geography 45.411★

Quaternary Geography

Changes in the physical environment of the earth during and subsequent to the last ice age. (Also listed as Geology 67.415★.)

Prerequisites: Geography 45.318★ and 45.315★ or permission of the Department.

Lectures three hours a week.

Geography 45.412★

Terrain Analysis

Statistical techniques of morphometric and spatial analysis; applications in geomorphology and geography.

Prerequisites: Geography 45.204 or equivalent, and Honours standing or permission of the Department.

Lectures three hours a week.

Geography 45.413★

Hydrology

Offered in the Department of Civil Engineering as Engineering 82.441★. (Also listed as Geology 67.419★.)

Geography 45.414★

Microclimatology

The formation of microclimates near the earth's surface; energy and water flows; the interaction of atmospheric processes with the physical properties of surfaces.

Prerequisite: Geography 45.315★ or permission of the Department.

Lectures and laboratory three hours a week.

Geography 45.415★

Earth Surface Materials

The properties and behaviour of soils and rocks that influence the development and stability of the earth's surface. Thermal and hydrologic conditions are considered with regard to energy flows, climatic change, soil erosion, landslides and other concerns. Emphasis is placed on the variety of natural processes, materials and landforms, and how these are important.

Prerequisite: Geography 45.318★ or permission of the Department.

Lectures, laboratories and field studies three hours a week.

Geography 45.417★

Introductory Soil Mechanics and Engineering Geology

Offered in the Department of Civil Engineering as Engineering 82.328★. (Also listed as Geology 67.417★.)

Precludes additional credit for Geography 45.424★, no longer offered.

Geography 45.418★

Geocryology

The effects of freezing and thawing on soils from thermodynamic and mechanical points of view; the distribution of seasonal ground freezing and permafrost; the ground thermal regime and its relationship to climate and earth materials; terrain features due to frost action; current geotechnical concerns relating to northern development.

Prerequisite: Geography 45.318★ or permission of the

department.

Lectures/laboratory three hours a week.

Geography 45.423★

Urban Revitalization

A seminar/field-work-based course that examines the recent revitalization of inner cities from an internationally comparative perspective. Topics of study include residential, commercial and institutional dimensions of revitalization, with particular reference to waterfronts and to heritage conservation issues.

Precludes additional credit for Geography 45.421★, no longer offered.

Prerequisites: Geography 45.320★ and Fourth-year Honours Geography standing, or permission of the Department.

Seminar three hours a week; optional residential field week.

Geography 45.425★

Geography and Equality

An examination of spatial variation in life-chances. Geographically varying access to goods such as health care, shelter, work, and security is considered in light of diverse ideas of equality.

Prerequisite: Geography 45.327★ or permission of the Department. Geography 45.370★ is also recommended.

Lectures and seminars three hours a week.

Geography 45.426★

Health, Environment and Society

The social and environmental contexts of human disease are examined through the methods and concepts of spatial epidemiology. The ecology of communicable and degenerative diseases is examined in First- and Third-World situations.

Prerequisite: Geography 45.327★ or permission of the Department.

Lecture two hours a week, laboratory/workshop two hours a week.

Geography 45.427★

Urban Development and Analysis

Examines the relationship between changes in urban development and geographic theory, emphasizing contemporary critical perspectives on selected urban issues.

Prerequisite: Fourth-year Honours Geography standing or permission of the Department.

Seminar three hours a week.

Geography 45.431★

Advanced Cultural Geography

Cross-cultural thematic examination of territorial organization, territoriality, mental maps, geographies of the mind, and landscape impact of authority and ideology. Regional foci are principally Canada and Africa.

Prerequisite: Geography 45.230★ or permission of the Department; Geography 45.231★ recommended.

Seminar three hours a week.

Geography 45.433★

Urban Planning

Offered in the Department of Civil Engineering as Engineering 82.433★ (82.333★).

Geography 45.434★

Transportation Engineering and Planning

Offered in the Department of Civil Engineering as Engineering 82.334★ (82.434★).

Geography 45.435★

Historical Geography

The relation of geography and history, the use of field

techniques, primary documents, model building and statistical methods in historical geography. Emphasis is given to local studies.

Prerequisite: Geography 45.335 or permission of the Department.

Geography 45.440★

Advanced Political Geography

Systematic concepts in political geography are applied to the analysis of specific contemporary regional problems, territorial conflicts and case studies such as European integration, the Middle East and Southern African conflicts, and the management of the world's oceans.

Prerequisite: Geography 45.337★ or permission of the Department.

Lectures three hours a week.

Geography 45.442★

Transportation Geography

Geographical appraisal of transportation systems in relation to their physical, social, and economic milieu. The role of transport in industrial location, regional development and trade patterns; problems of urban transport and Canadian transportation policy issues. (Also listed as Engineering 82.435★.)

Prerequisite: Geography 45.220★ or permission of the Department.

Geography 45.444★

Outdoor Recreational Land-Use

Examination of recreational land-use in Canada, including: the evolution of leisure and outdoor recreation, users' preferences, demand and supply, impacts, the role of governments, planning and management of parks, contrasts of urban and wilderness recreation, and current trends and conflicts.

Prerequisite: Fourth-year Honours Geography standing, or permission of the Department.

Seminar three hours a week.

Geography 45.445★

Land Resource Use

This course examines, from both theoretical and empirical approaches, the nature and problems of man's use of land resources. The emphasis is on the processes, the impacts of urbanization on rural land patterns and on contemporary methods of land evaluation and classification.

Prerequisite: Geography 45.333★ or permission of the Department.

Lectures/seminars three hours a week.

Geography 45.446★

Practicum In Geography

Experience is gained in an employment environment through field placements of seven hours a week, providing the opportunity to observe and become involved in issues and research methods used by geographers. Academic requirements are satisfied through a term paper, which integrates the understanding gained from the placement with theoretical and empirical knowledge gained from a literature review, and participation in a class-forum.

Precludes additional credit for Geography 45.443★ taken before 1988-89, and for any other Social Science practicum.

Prerequisites: Fourth-year Honours standing and permission of the Department.

Geography 45.490★

Development of Geographic Thought and Methodology

The development of ideas and methods in geography. An examination and discussion of original works. Recommended for Honours students.

Prerequisite: Fourth-year standing or permission of the Department.

Lectures three hours a week.

Geography 45.491★

Research Project Design

Design and implementation of a geographical research project, based on primary and secondary sources of information. The student will select a research topic, place it in its intellectual and methodological context and develop an appropriate research plan. The project may take the form of an experiment, a case study, a survey, archival research, or such other work as meets with the Department's approval.

Prerequisite: Fourth-year Honours standing in Geography. Lectures and discussion three hours a week.

Geography 45.492★

Research Project Report

Under the supervision of a faculty member, the student will complete the research project initiated in Geography 45.491★ and submit a project report.

Prerequisite: Geography 45.491★

Hours to be arranged with faculty adviser.

Geography 45.496

Honours Research Project

Candidates for B.Sc. with Honours in Geography undertake a research project based on a laboratory or field problem. The project is supervised by a member of the department and a written report must be submitted. The candidate may be examined orally on the report.

Prerequisite: Fourth-year standing in the Geography B.Sc. Honours program.

Day division: Hours arranged.

Supervisor of B.Sc. Honours Studies (co-ordinator)

Geography 45.499

Honours Research Essay

A student in the final year of B.A. Honours or Combined Honours in Geography may write an Honours essay or equivalent. The essay counts as the equivalent of one credit. Students work under an individual faculty adviser. The subject for research is decided upon in consultation with the supervisor.

Prerequisites: Fourth-year Honours standing in Geography and permission of the B.A. Honours Supervisor.

Day division: Hours to be arranged with faculty adviser.

Supervisor of B.A. Honours Studies (co-ordinator)

Dunton Tower, Room 1315
Telephone: 788-2115

Officers of Instruction

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Professor Emeritus

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Professor

Jutta Goheen

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Arnd Bohm

Joseph B. Dallett

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Sessional Lecturers

Sigrid Bostock

Andrea Mein

Inara Moeser

Ursula Mount

General Information

German language and literature can be seen in various ways: in their historical dimension, with all the wealth of cultural context that implies; as the subject matter of more theoretical frames of reference such as linguistics or aesthetics; and as contemporary means of communication. These three approaches all play a part in German studies at Carleton.

The Department's offerings range from German for beginners (one credit or two credits) up to the M.A. program. One can take a single German course, or a sequence, or a whole program (Pass or Honours). In the latter case, students often find that to have a twofold specialization (i.e. to take a Combined Pass or Combined Honours) suits them. It is also possible, while to some extent specializing in German, to take a sequence of two or three courses in another field, such as economics, or computer science, or another language.

The combinations are many and various, and the Department accommodates both those whose prime objective is practical command of the language (as taught in a university context) and those who wish to study an unusually rich literature.

Unless otherwise noted, the Department's courses are taught wholly or partly in German. Students have access to the language laboratory, including computer-assisted learning. Language courses are not available to auditors. Literature courses may be audited with permission of the Department.

Lists of required readings are available from the Secretary of the Department.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty

regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Intensive Introductory German

Students considering beginning the study of German at Carleton should take particular note of German 22.120, Intensive Introductory German (two credits). This course is designed to enable students to reach in one year the level of proficiency normally attained over two years in German 22.115 and 22.205.

Undergraduate Programs

Core Programs

There are four alternative undergraduate programs, all of which normally include the following core in German:

1. 22.120 Intensive Introductory German;
or 22.205 Intermediate German A;
or 22.206 Intermediate German B;
2. 22.209★ Spoken German and one of
22.210★ Written German
or 22.211★ Descriptive Analysis of Present-Day German I;
or 22.212★ Descriptive Analysis of Present-Day German II;
3. 22.240 Introduction to Literary Reading.

To that core, students during their program, and in consultation with the Department, add a number of options. The number of these options to be added to the core varies according to the program.

Students should note that before 1988-89, German 22.205 was numbered 22.150, 22.206 was 22.151, 22.209★ was 22.201★, and 22.210★ was 22.202★.

Students who completed German 22.250 prior to 1988-89 may substitute German 22.250 for 22.240.

Students whose backgrounds preclude their taking any of the core language courses must still complete the total of credits required for their program.

Single Pass

Core plus three credits in German, at least one of them at the 300 level; i.e. six in all.

Combined Pass

Core plus two credits in German, at least one of them at the 300 level; i.e. five in all.

Single Honours

Core plus six credits in German, one of which must be German 22.350. Of these nine total credits in German at least one must be at the 400 level.

Combined Honours

Core plus four credits in German, one of which must be German 22.350. Of these seven total credits in German at least one must be at the 400 level.

All Programs

Students with an advanced knowledge of German will

select a suitable course program in consultation with the Department.

A written language test is normally part of the degree requirements; students must take the test no later than December for June graduation, May for November graduation, and August for February graduation. The test must be completed before graduation.

Combined Pass Programs

Combined Pass programs are possible with a number of other subjects, among them Art History, Music, History, Philosophy, Political Science, Religion, Linguistics, Latin, English, French, Spanish, Italian and Russian. Early consultation with the departments concerned is advised.

Combined Honours Programs

Combined Honours are possible with a variety of subjects. Among the possibilities are German with Art History, Economics, English, French, Geography, History, Italian, Latin, Linguistics, Mathematics, Music, Philosophy, Political Science, Psychology, Russian or Spanish. Early consultation with the departments concerned is strongly advised.

All Honours programs, including Combined ones, are designed to serve, where required, as a basis for further work in German at the graduate level.

Related Courses

In various departments of the University, courses are offered on other aspects of the German-speaking area; these courses cover the past and the present, and include a wide variety of topics in the humanities and social sciences. Students considering a Major or Honours degree in German should not overlook the opportunities present in the University which enable them to add, if they so wish, these additional dimensions to their studies. A list of such courses is available from the Department.

Other Options for Undergraduate Students

The attention of Honours students is drawn to the courses offered by the Comparative Literature Committee.

Graduate Program

The Department of German offers studies leading to the degree of Master of Arts. For further details consult the Graduate Studies and Research Calendar.

Courses Offered

German 22.111

Introduction to German Linguistics

An introduction to key concepts in the study of the linguistic structure of German. Taught in English.

Co-requisite: German 22.115.

Day division: Lectures and language laboratory three hours a week.

German 22.115

Introductory German

A beginners' course designed to give a sound grasp of the fundamentals of present-day German. (The facilities of the language learning resource centre are open to students.)

Day and Evening divisions: Four hours a week.

German 22.118

Reading German

A course for beginners interested in the rapid acquisition of a reading knowledge of German. Grammar; use of dictionaries; basic vocabulary; practice with selected texts from various fields, such as art history, history, journalism, musicology, and the natural and social sciences. Taught in English.

Day division: Four hours a week.

German 22.120 (two credits)

Intensive Introductory German

An intensive course designed to enable students with little or no previous knowledge of German to reach in one year the level of proficiency normally attained over two years in German 22.115 and 22.205. The course thus provides a basis for majoring in German, but enrolment is not restricted to intending Majors. Students not making satisfactory progress may transfer to the regular introductory course, German 22.115.

Prerequisite: Permission of the Department.

Day division: Eight hours a week.

German 22.205

Intermediate German A

Using a number of teaching methods, the course takes students from successful completion of the elementary course to a stage where they are able to express themselves with greater ease in a variety of situations. Material for the course is drawn from several sources, and is directed above all towards improved oral competence without, however, neglecting the skills of reading and writing.

Prerequisite: German 22.115 or 22.118 or equivalent.

Day and Evening division: Four hours a week.

German 22.206

Intermediate German B

This course pursues objectives similar to those of German 22.205 and is designed for students who enter it with a higher-than-average standing on the elementary level, or with several years of high school or equivalent background. Grammar work and texts are appropriately adapted to this group, which is likely to include declared or prospective Majors.

Prerequisite: Standing of B+ or better in German 22.115 or equivalent.

Day division: Four hours a week.

German 22.209★

Spoken German

Upon completing this course, students should be able to speak German at the "Intermediate-high" level of the ACTFL Proficiency Guidelines. That is, students should be able to handle successfully most uncomplicated communicative tasks and social situations; should be able to initiate, sustain and close a general conversation with a number of strategies appropriate to a range of circumstances and topics; should demonstrate connected discourse, particularly for simple narration or description.

Prerequisite: German 22.120 or 22.205 or permission of the

Department. (This course is not open to native speakers of German.)

Evening division, Fall term: Three hours a week plus laboratory assignments.

German 22.210★

Written German

A course parallel to German 22.209★, and emphasizing comprehension and self-expression in written German, by such means as essay-writing and translation into and from German. Practical complement to German 22.212★

Prerequisite: German 22.120 or 22.205 or 22.206, or permission of the Department.

Day division, Winter term: Three hours a week.

German 22.211★

Descriptive Analysis of Present-Day German I

Patterns of German word formation and their interaction with syntactic structures. Analysis of text samples from various written sources; some practice in writing short essays in German.

Prerequisites: German 22.120 or 22.205 or 22.206, and German 22.111, or permission of the Department.

Day division, Fall term: Three hours a week.

German 22.212★

Descriptive Analysis of Present-Day German II

An explication of German sentence structure in the light of current linguistic theories. Text analysis and some practice in writing. Practical Complement to German 22.210★

Prerequisites: German 22.211★ or permission of the Department.

Day division, Winter term: Three hours a week.

German 22.240

An Introduction to Literary Reading

An introduction both to representative works of German literature (to be read in German), and to the informed discussion of literary texts, including narrative fiction, poetry and drama.

Prerequisite: German 22.118 or 22.120 or 22.205 or 22.206 or permission of the Department.

Day division: Three hours a week.

German 22.301★

Advanced Spoken German

Practice of oral comprehension and spoken German in discussions, short presentations and casual talks; based on material (films and texts) illustrating concerns of post-war Germany.

Prerequisite: German 22.209★ or 22.210★ or permission of the Department.

Fall term: Three hours a week.

German 22.302★

Advanced Written German

The writing of descriptive, analytical and expository texts.

Prerequisite: German 22.210★ or 22.211★ or 22.212★ or permission of the Department.

Winter term: Three hours a week.

German 22.311★

Linguistic Text Analysis

Theory (structure, function and examples of written and spoken texts) and praxis of text analysis (representing fiction and non-fiction in modern German), production of written and spoken texts of various nonfictional types (*Gebrauchstexte*).

Prerequisite: German 22.211★ or 22.212★ or permission of the Department.

Not offered 1990-91.

German 22.312

Twentieth-Century German as a Literary Language

The style of narrative prose from the viewpoint of discourse analysis. Texts by authors such as Rilke, Thomas Mann, Kafka, Christa Wolf.

Prerequisite: German 22.210★ or 22.211★ or 22.212★ or permission of the Department.

Day division: Three hours a week.

German 22.348★

A Genre in German Literature

This course discusses in different years the development of one of the literary genres (poetry, drama, prose) within a specific time-frame. Topic for 1990-91: the *Novelle*: Traditions and theories of this short prose form studied through selected authors, for example, Keller, Stifter, Thomas Mann.

Prerequisite: German 22.240 or permission of the Department.

Day division, Fall term; Three hours a week.

German 22.350

German Literature of the Eighteenth Century

The literature of the Enlightenment, Storm and Stress, and Early Classicism, with special emphasis on the works of Lessing, Goethe and Schiller.

Prerequisite: German 22.240 or permission of the Department.

Not offered 1990-91.

German 22.352★

Seminar on a Nineteenth-Century Topic

This course discusses, for example, an author, a genre, a theme. Topic for 1990-91: Heine and his contemporaries; Reactions to social and political change in the period approximately from 1820 to 1860.

Prerequisite: German 22.240 or permission of the Department.

Day division, Winter term; Three hours a week.

German 22.380

German Literature in the Twentieth Century

Representative texts from drama, poetry, and prose fiction in the period from Hauptmann to Grass with emphasis on drama and the theory of drama since the 1920s.

Prerequisite: German 22.231★ or 22.240 or 22.255★ or 22.260★ or permission of the Department.

Not offered 1990-91.

German 22.401★

Formal German Speech (Die deutsche Rede)

A study of rhetorical and linguistic patterns in oral communication: analysis of spoken texts and practice in the strategy of discussion.

Prerequisite: German 22.301★ or 22.312 or permission of the Department.

Day division, Winter term: Three hours a week.

German 22.402★

Translation

Practical exercises in translation and consideration of some theoretical approaches.

Prerequisite: German 22.302★ or 22.311★ or permission of the Department.

Day division, Fall term: Three hours a week.

German 22.403★

German Syntax

A systematic investigation of the principles of syntax in modern written German.

Prerequisite: German 22.302★ or 22.311★ or 22.402★ or

permission of the Department.
Day division, Fall term: Three hours a week.

German 22.412

History of the German Language

Significant stages in the development of German: the evolution of its phonetic and grammatical structure, its vocabulary and stylistic norms. The social role of language of the twentieth century: language as a means of manipulation (Nazi Germany; advertising), divided German (FRG and GDR); socio-linguistic facets of contemporary literary language.

Prerequisite: One of German 22.211★, 22.212★, 22.312, 22.430 or permission of the Department.

Not offered 1990-91.

German 22.430

Medieval Language and Literature

Introduction to Medieval German; Medieval narrative style in heroic epic poetry (*Nibelungenlied*) and early vernacular love poetry (*Minnesang*).

Prerequisite: German 22.240 or permission of the Department.

Not offered 1990-91.

German 22.441★

German Literature of the Sixteenth Century

Readings in imaginative literature; non-fiction including religious polemics; selected hymns.

Prerequisites: German 22.240 and one full course (or equivalent) in German at the 300 level, or permission of the Department.

Day division, Fall term; Three hours a week.

German 22.442★

German Literature of the Seventeenth Century

Readings in the literature of the German Baroque: fiction, drama and poetry.

Prerequisites: German 22.240 and one full course (or the equivalent) in German at the 300 level, or permission of the Department.

Day division, Winter term: Three hours a week.

German 22.454★

Seminar on a Topic from the Eighteenth Century

A detailed study of a movement, an author, a genre, etc. Topic for 1990-91: Concepts of the "Sublime" from Gottsched to Schiller.

Prerequisite: German 22.350 or permission of the Department.

Not offered 1990-91.

German 22.469★

Selected Authors of the Nineteenth Century

A detailed study of works by specific authors such as Fontane or Keller or Kleist.

Prerequisite: German 22.240 or permission of the Department.

Not offered 1990-91.

German 22.470

Seminar on a Literary or Linguistic Topic

Not offered 1990-91.

German 22.471★

Seminar on a Selected Topic

Expressionism: prose, drama and poetry by Expressionist writers, including Trakl, Benn, Stadler, Barlach, Kaiser, Kafka and Lasker-Schüler.

Prerequisite: German 22.240 or permission of the Department.

ment.

Day division, Winter term: Three hours a week.

German 22.472

Literary Semiotics

Analysis of literary texts to discover the sign-systems through which literature communicates meaning. In different years the principal object of study will be the semiotics of either poetry or narrative prose or drama.

Prerequisite: German 22.240 or permission of the Department.

Not offered 1990-91.

German 22.483★

Language and Society in Twentieth-Century Germany

Language as a means of manipulation; divided German; socio-linguistic aspects of contemporary literary language. The course concentrates on one of these aspects. For specific information the student should consult the Department.

Not offered 1990-91.

German 22.490★

Tutorial on a Selected Topic

Primarily for Honours students in their final year. A genre, an author or a group of authors is selected; methods of literary criticism are considered.

German 22.491

Tutorial

As above, but offered for full credit, with a corresponding enlargement of scope and assignments.

German 22.492★

Tutorial in Advanced Translation

Primarily for Honours students in their final year. In consultation with the Department, students complete a substantial translation project. Theoretical and institutional problems of translation are considered.

Prerequisites: German 22.311★ and 22.402★ or permission of the Department.

German 22.499

Honours Essay

Open to candidates for Honours German in their Fourth year, with the permission of the Department.

Paterson Hall, Room 400
Telephone: 788-2828

Officers of Instruction

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B.E. Rapley

Programs of Study

Students intending to major in History, whether in the Pass,

Honours, or Graduate program, should first consult with the appropriate adviser (below). Students considering an Honours program should note particularly the compulsory requirements not included in the Pass program. All majors in History should review their course of study annually with the appropriate adviser.

Pass students, Y.A. Bennett
Honours students, D. Gorham
Graduate students, R.A. Jones
Mention-français, E.P. Fitzgerald

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Pass Programs

Entrance and Continuation

Entry into History Pass programs requires enrolment in a 100-level History course, or an equivalent approved by the Department. Continuation requires completion of such a course with at least a C- average, and maintenance of a minimum C- average over all other History courses successfully completed. History graduation averages will be calculated on the six best History credits for Pass and the four best for Combined Pass programs.

Neither History 24.490 nor 24.491 may be presented for graduation in a Pass degree program. Other 400-level credits may be presented with permission of the Department.

Pass Program in History

1. Students majoring in History are to take a minimum of six History credits as follows:

- (a) one 100-level credit, to be taken in the First year;
- (b) at least two 200-level credits, to be completed by the end of the Second year. A third 200-level credit is usually recommended;
- (c) at least two 300-level credits, to be taken in the Third year. The Department may permit a third 300-level credit in lieu of a third 200-level credit.

2. The courses offered at the 200 and 300 levels generally fall into the following four fields:

- (a) ancient, medieval and early modern Europe;
- (b) modern Europe;
- (c) North America;
- (d) European expansion and the non-Western world.

Students in a Pass program in History are required to take at least one credit in three of the four fields. History 24.388 may not be used to satisfy this field requirement except in extraordinary cases and with the permission of the Department.

Combined Pass Program

Pass programs combining History with another subject require at least five History credits, with at least two credits at the 200-level and at least two credits at the 300 level. Students in the Combined Pass program must take one credit in at least two of the four fields listed above under item 2. of the "Pass Program in History".

Honours Program

1. The Honours program requires 11 credits in History:
 - (a) one 100-level credit, to be taken as part of the First year;
 - (b) two 200-level credits, to be taken in the Second year;
 - (c) three 300-level credits, to be taken in the Third year and to include History 24.388;
 - (d) three 400-level seminar credits to be taken in the Fourth year. Not more than two seminars may be taken in any one of the following fields:
 - (i) ancient, medieval and early modern Europe;
 - (ii) modern Western Europe;
 - (iii) Russia and Eastern Europe;
 - (iv) Great Britain and the Commonwealth;
 - (v) Canada;
 - (vi) United States;
 - (vii) European expansion and the non-Western world.

One of these seminar credits may, with departmental approval, be taken in a discipline other than History. Students choosing this option will be required to present only ten History credits. A student may elect to present a research essay (History 24.499) in place of any two 400-level seminars;

- (e) History 24.490 and History 24.491 to be taken in the Fourth or final year.

2. The courses offered at the 200 and 300 levels generally fall into the following four fields:

- (a) ancient, medieval and early modern Europe;
- (b) modern Europe;
- (c) North America;
- (d) European expansion and the non-Western world.

Honours students in their first three years are required to take at least one credit in three of the four fields. History 24.388 may not be used to satisfy this field requirement except in extraordinary cases and with the permission of the Department.

Students are required to show a proficient reading knowledge of French. This requirement may be satisfied by:

- (a) the completion of French 20.106★ *Reading French* with a grade of C or better, or any course offered by the Department of French with a number higher than 20.106★; or
- (b) passing the Department of History's language examination.

Students may substitute another language, with the permission of the Department, if it is more appropriate to their program.

Students intending to enter the Honours program are advised to do so as early as their intentions are settled, and not later than the beginning of the Third year. All students who meet the general University Honours requirements, and who have a grade-point average of at least 6.0 in History, will be admitted to, and permitted to continue in the Honours program. Other applicants will be given individual consideration on application to the Department.

Honours students in good standing may revert to the Pass program with a B.A. at the end of the Third year. Students in the Fourth year may also do so, but may not present either History 24.490 or 24.491 for graduation in a Pass degree. Other 400-level credits may be presented with the permission of the Department. Students who have not taken History 24.388 in their Third year will require the permission of the Department to enter the Fourth year. In determining the class of an Honours candidate's degree,

the Department will average the grades on all History credits, those in the 400-level courses being given double weight.

There is no limit to the number of qualified students admitted to the Fourth year of the Honours program; however, allocation of students among the 400-level seminars will be determined by the Department after consultation with individual students. For details, consult the Honours adviser. This regulation will not be applied in such a way as to limit a student's opportunity to complete requirements prescribed for a degree in History.

Combined Honours Programs

Students combining History with another subject will be expected to meet the language requirement of the Department (see foregoing, *Honours in History*), and to complete at least six credits in History. Only one of these six credits may be taken at the 100 level and at least one must be at the 300 level. The program must include two History credits at the 400 level, one of which must be a seminar.

Mention: Français

Students in the Pass or Honours program in History may qualify for the notation "Mention: français" (pp. 41, 66) by fulfilling the requirements outlined below. Those wishing to pursue this path should consult with the Department's "Mention: français" adviser. Approval of this adviser is required for all courses under the "Mention: français".

History courses presented in fulfilment of the "Mention: français" requirement can double as courses to satisfy History Pass or Honours requirements.

Students enrolling in courses at the University of Ottawa will do so through the University of Ottawa Exchange Program. To enrol in courses in French at another university, students must obtain a Letter of Permission (see articles 3.10 and 3.12, pp. 58-59).

Pass or Combined Pass

To graduate with the notation "Mention: français" students must include in their program the following:

1. One credit in French language chosen in consultation with the Department of French for the purpose of perfecting the student's French language skills.
2. One credit from the following list of courses taught in French at Carleton or the University of Ottawa and concerned with the study of the heritage and culture of French Canada:

(Carleton) French 20.267★, 20.268★, 20.281★; (University of Ottawa) Histoire HIS 2601, HIS 2701; Français FRA 2525, FRA 2526, FRA 2711, FRA 2714, FRA 2722, FRA 2727; Linguistique LIN 2502; Etudes Religieuses SRS 2530.
3. One credit in History at the 200 or 300 level taught in French at Carleton, at the University of Ottawa or at another university. At Carleton, History 24.390 and 24.391★ are available in French to meet this requirement.
4. Combined Pass students must meet the "Mention: français" requirements of both disciplines.

Honours and Combined Honours

To graduate with the notation "Mention: français" students must include in their program the following:

1. One credit in French language chosen in consultation with the Department of French for the purpose of perfecting the student's French language skills.
2. One credit from the following list of courses taught in French at Carleton or the University of Ottawa and relating to the French experience in Canada: (Carleton) French 20.267★, 20.268★, 20.281★; (University of Ottawa) Histoire HIS 2601, HIS 2701; Français FRA 2525, FRA 2526, FRA 2711, FRA 2714, FRA 2722, FRA 2727; Linguistique LIN 2502; Etudes Religieuses SRS 2530.
3. One credit in History at the 200 or 300 level taught in French at Carleton, at the University of Ottawa or at another university. At Carleton, History 24.390 and 24.391★ are available in French to meet this requirement.
4. Either History 24.498, or a one-credit History seminar at the 4000 level taught in French at the University of Ottawa. All written work must be submitted in French.
5. Combined Honours students must meet the "Mention: français" requirements of both Honours disciplines.
6. The language requirement associated with Honours or Combined Honours in History is waived for students enrolled in the "Mention: français."

Cross-Listed Courses

The Department of History cross-lists several courses offered by other departments (e.g., several Classical Civilization courses in the Department of Classics). No more than two credits in cross-listed courses may be included in the six credits required for the Pass program or the four credits required in Combined Pass programs. No more than three full credits in cross-listed courses may be included in an Honours or Combined Honours program.

Prerequisites

Unless otherwise stated, the prerequisite for any 300-level course is:

1. A 200-level course, preferably in an appropriate field (for fields, see *Pass Program in History*, paragraph 2); or
2. Permission of the Department.

The prerequisite for any 400-level course is permission of the Department. Permission will normally be granted to students who have taken two 300-level History courses, with one course at either the 200- or 300-level in an appropriate field.

Courses Offered

History 24.100

Turning Points in Modern History

Introductory seminars emphasizing the development of writing, research and analytical skills through the intensive examination of selected topics in modern history (e.g., the Italian Renaissance, the French Revolution, the impact of science, industrialization, the origins of the world wars). The

numbers in each seminar will be kept small in order to provide an opportunity to work closely with individual faculty members. Orientation of the course might prove inappropriate for Second- and Third-year students. Consultation is advised.

Day division: Three hours a week.

R.B. Goheen, P.C. Merkley, R. Phillips

History 24.101

History of Western Civilization

A survey of the major events, ideas and movements that have shaped western civilization from the fall of Rome to the twentieth century.

Day division: Three hours a week.

J.G. Bellamy, J. Kovalio, W.R. Laird, F.A.J. Szabo

History 24.102

The World in the Twentieth Century

An introduction to the ideologies, political movements, economic forces and international conflicts that have shaped the contemporary world. This course is designed primarily for students who do not plan to major in History.

Day and Evening divisions: Three hours a week.

Y.A. Bennett, B.E. Rapley

History 24.130

Modern Canada

A historical study of the political, economic and social development of Canada with emphasis on the twentieth century.

Day and Evening divisions: Three hours a week.

K.M. Abel, B.C. Bickerton

History 24.205

England During the Middle Ages

A study concentrating on the political development of medieval England and her French possessions, A.D. 1066-1485.

Day division: Three hours a week.

J.G. Bellamy

History 24.210

Introduction to the History of Ideas

A study of Western intellectual development since the Renaissance which considers such movements as humanism, the Enlightenment, romanticism, Darwinism and contemporary ideologies.

Not offered 1990-91.

History 24.215

Renaissance Europe

The political and cultural history of Europe in the fourteenth, fifteenth and sixteenth centuries, with emphasis on the Italian Renaissance and its diffusion into England and France.

Day division: Three hours a week.

M. Phillips

History 24.221

History of Science

An introduction to the history of science from antiquity to the twentieth century. Reading includes works by Plato, Aristotle, Grosseteste, Aquinas, Galileo, Newton, Darwin and Einstein. No special knowledge of modern science is assumed.

Day division: Three hours a week.

W.R. Laird

History 24.224

The Revolutionary Tradition in Europe, 1789-1900

Beginning with the French Revolution of 1789, the course includes such significant movements as romanticism, nationalism, the rise and implications of industrialism, and the development of socialist theory culminating in Marxism. Day division: Three hours a week.

H.A. MacDougall

History 24.233

Canadian Political History

A historical survey of the Canadian political tradition from the late eighteenth century to the present. Politicians, parties, ideas, social context and dissent are examined. Second-year standing recommended.

Day division: Three hours a week.

History 24.234

Canadian Social History

A historical survey of the structure and values of Canadian societies from the eighteenth to the twentieth centuries. Second-year standing recommended.

Day division: Three hours a week.

J.H. Taylor

History 24.235

Canadian Economic History

A historical survey of persistence and change in the Canadian economy from the eighteenth to the twentieth centuries. (Also listed as Economics 43.235.)

Prerequisite: Economics 43.100 or permission of the Department of History.

Day division: Three hours a week.

R.F. Neill

History 24.236

The Spanish and English Colonies in North America

A comparative study of the development of the English North American colonies and New Spain (Mexico), with emphasis on settlement, social patterns and institutions, the frontier, native peoples and the emergence of a colonial sense of identity.

Not offered 1990-91.

History 24.237

The History of Latin America

A survey of the political, economic, and social development of Latin America from the colonial era to the twentieth century, with particular emphasis on Mexico, Argentina, and Brazil.

Summer session 1990, Day division, Second term.

R.N. Harpelle

History 24.240

History of the United States of America

A survey of United States politics and society since the American Revolution.

Day division: Three hours a week.

P.J. King

History 24.250

Modern England, 1460-1960

A survey of significant political and social developments in England from the mid-fifteenth to the mid-twentieth century.

Day division: Three hours a week.

R.B. Goheen

History 24.254

Introduction to the History of Women

A survey of themes in the history of women with emphasis

on their European experience, from the early modern period to the present.

Evening division: Three hours a week.

D. Gorham

History 24.256

Comparative History of England and France

A comparison of political and social developments in two major Western European countries, from the seventeenth to the nineteenth century.

Day division: Three hours a week.

N.E.S. Griffiths

History 24.259

A History of Germany

A history of the German-speaking peoples from the rise of the Holy Roman Empire to the present.

Day division: Three hours a week.

F.A.J. Szabo

History 24.260

History of Russia and the U.S.S.R.

A survey of Russian history from Kiev to the present, with emphasis on the period from the reign of Peter the Great to the Revolution of 1917.

Day division: Three hours a week.

R.C. Elwood

History 24.270

European Economic History, circa 1500-1900

The economic development of modern Europe within the emerging world economy, from the beginnings of overseas expansion through the Industrial Revolution. (A knowledge of economics is not a prerequisite.)

Day division: Three hours a week.

E.P. Fitzgerald

History 24.271

The Expansion of Europe Overseas

A survey of Europe's commercial and colonial expansion in the modern period with emphasis on the debate over the economic causes and consequences of colonialism.

Not offered 1990-91.

History 24.275

History of Africa

An introduction to the history of Africa. The first half is devoted to the period prior to European colonization with emphasis on West African states and empires; the second half deals with resistance to colonization, European colonial rule, independence and liberation movements.

Evening division: Three hours a week.

D.C. Savage

History 24.278

The Middle East: 1798 to the Present

Offered in the Department of Religion as Religion 34.278.

History 24.280

The Diplomatic History of Europe, 1815-1914

A survey of diplomatic history from the Congress of Vienna to the outbreak of the First World War.

Not offered 1990-91.

History 24.281

War and Peace in the Modern World

A comparative survey of the social consequences of war for the major Western European states and Russia from Napoleon to Hitler, and the efforts of international organizations and governments to seek alternative ways to resolve

international conflict.

Evening division: Three hours a week.

Y.A. Bennett

History 24.285

History of China

A survey of Chinese political and intellectual history from the Xia Dynasty to the 1911 Revolution. Emphasis is placed on the impact of the West on China from the sixteenth to the twentieth century.

Day division: Three hours a week.

J.W. Strong

History 24.286

History of Japan

A survey of Japanese history from the legendary beginning of the country in 600 B.C. to the Sino-Japanese War of 1894.

Day division: Three hours a week.

J. Kovalio

History 24.290

History of Ancient Greece

Offered in the Department of Classics as Classical Civilization 13.290.

History 24.291

History of Ancient Rome

Offered in the Department of Classics as Classical Civilization 13.291.

History 24.302

The Later Roman Empire

A study of major developments-administrative, ecclesiastical, cultural and societal-of the later Roman Empire. (Also listed as Classical Civilization 13.302.)

Prerequisite: A 200-level History course.

Day division: Three hours a week.

R.C. Blockley

History 24.303

History of the Byzantine Empire, 527-1453 A.D.

Offered in the Department of Classics as Classical Civilization 13.303.

Not offered 1990-91.

History 24.305

Medieval Thought

A general examination of medieval European intellectual life, with special reference to its setting in monastery, cathedral school, and university.

Prerequisite: A 200-level History course.

Day division: Three hours a week.

W.R. Laird

History 24.309★

Studies in Greek History and Institutions

Offered in the Department of Classics as Classical Civilization 13.321★.

History 24.311★

Studies in Roman History and Institutions

Offered in the Department of Classics as Classical Civilization 13.322★.

History 24.312★

The Italian Renaissance

Studies in political, social and intellectual history, concentrating on Florence and Venice. Readings are in both primary and secondary works. Some representative themes are: Florence and Venice compared; the family and

the individual; humanism and the city.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.313★

Historical Writing and Political Thought in Renaissance and Reformation Europe

This course examines a series of political and historical thinkers in relation to early modern society. Special attention is given to the evolution of historical narrative.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.314★

Studies in Ancient History and Institutions

Offered in the department of Classics as Classical Civilization 13.323★.

Not offered 1990-91.

History 24.316

The Era of the French Revolution, 1776-1815

A study of the transformation of Old France into a modern nation during the Revolutionary and Napoleonic period and of its rivalry with Britain at that time. The theme of the course is the development of conflict, both political and martial, arising from differing concepts of freedom.

Precludes additional credit for History 24.318.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.317

The European Family

A comparative study of the family in early modern and modern Europe. Themes to be examined include family and household forms; family economy and government; demography; law; marriage formation, stability and breakdown; gender and family relationships; sexuality. The family is considered in its own right and in terms of broader social, economic and political developments.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.318

France Under the Old Regime and Revolution

A study of the main social, economic and political developments in eighteenth-century France, with particular emphasis on the origins and course of the Revolution up to 1799. Topics include social structure, authority and protest, religion and secularization, theory and practice of government, and economic change.

Precludes additional credit for History 24.316.

Prerequisite: A 200-level History course.

Day division: Three hours a week.

R. Phillips

History 24.321

The Enlightenment

A study in eighteenth-century reformist thought with particular attention given to the French *philosophes*. Their contribution to the French Revolution and the emergence of an anti-Enlightenment reaction are considered.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.323

Religion and the State, Europe 1815-1965

A study of selected problems in modern religious history from the end of the French Revolution to Vatican Council II. Areas to be represented include the rise and decline of liberal Catholicism, the Oxford movement, Christian Socialism, Bismarck and the churches, the growth of anti-

Semitism, Zionism, Vatican Council II.
Prerequisite: A 200-level History course.
Not offered 1990-91.

History 24.324

Colonial Frontier Societies

An examination of four or five frontier societies in the eighteenth and nineteenth centuries, most of them Canadian, in which the presence of either European or North American metropolitan influences were critical to the character of development.

Prerequisite: A 200-level History course.
Not offered 1990-91.

History 24.325

History of Business in Canada: 1850-1980

An examination of the place of business in Canadian society, economics and politics. The course covers both the internal dynamics of Canadian business (organization, strategy, the rise of the manager), and its external implications (competition, foreign investment, business-government relations).

Precludes additional credit for Business 42.468★.
Prerequisite: A 200-level History course.
Not offered 1990-91.

History 24.326★

Old Canada, 1740-1850s

An examination of the processes of social formation and change in the St. Lawrence Valley in the critical period of development from the height of French success in 1740 to the emergence of Montreal as a major metropole by the 1850s.

Prerequisite: A 200-level History course.
Not offered 1990-91.

History 24.327★

Introduction to Local History

An examination of the methods and approaches that characterize recent British, French and North American writing on local history.

Prerequisite: A 200-level History course.
Not offered 1990-91.

History 24.328★

Eastern Ontario Communities

The local history of Eastern Ontario, with particular reference to the settlement and development of the Ottawa Valley in the nineteenth century.

Prerequisite: History 24.327★ or permission of the Department.
Not offered 1990-91.

History 24.329★

Canadian Urban History

An introduction to urban growth and development in Canada. The course considers the historical basis of the urban pattern and its influence in Canada, and the internal structure and institutions of Canadian cities. In particular, Ottawa is used as a case study for classroom and research purposes.

Prerequisite: A 200-level History course.
Summer session 1990, Evening division, First term.
J.H. Taylor

History 24.330★

The History of Upper Canada to 1867

An introduction to the economic, social and political development of Upper Canada to the time of Confederation.

Prerequisite: A 200-level History course.
Not offered 1990-91.

History 24.331★

Quebec Since the 1860s

A social, economic, cultural and intellectual history of Quebec with emphasis on the development of Quebec nationalism.

Prerequisite: A 200-level History course.
Day division, Fall term: Three hours a week.
F.J.K. Griezic

History 24.332★

The Atlantic Provinces

Selected periods in the history of the four Atlantic Provinces. Themes covered include: settlement and population; economic trends; religious and cultural development; social and political evaluation.

Prerequisite: A 200-level History course.
Day division, Winter term: Three hours a week.
B.C. Bickerton

History 24.333★

The History of Ontario, 1867-1967

An introduction to the economic, social and political development of the Province of Ontario.

Prerequisite: A 200-level History course.
Summer session 1990, Evening division, First term.
J.K. Johnson

History 24.334★

Canada-United States Relations

An examination of Canada-United States relations, with particular attention to the relationship in the twentieth century.

Prerequisite: A 200-level History course.
Day division, Fall term: Three hours a week.

History 24.335

History of Canadian Labour

A social, economic, political and cultural history of workers' responses to the evolving Canadian capitalist system, with emphasis on the twentieth century.

Prerequisite: A 200-level History course.
Day division: Three hours a week.
F.J.K. Griezic

History 24.336★

Canadian External Relations

The development of Canadian attitudes and policies toward external affairs in the years since 1867, with particular emphasis on the twentieth century.

Prerequisite: A 200-level History course.
Evening division, Fall term: Three hours a week.
G.N. Hillmer

History 24.337★

Development and Underdevelopment in Atlantic Canada, 1660-1960

Case-study analyses of the contrasts of development in different regions of all four Atlantic provinces from early colonial times to the modern period.

Prerequisite: A 200-level History course.
Not offered 1990-91.

History 24.338

Canadian Immigration and Settlement

A study of immigration to Canada and of the adaptation of immigrants to their new environment from the beginning of the nineteenth century to the Second World War.

Prerequisite: A 200-level History course.
Not offered 1990-91.

History 24.339★

History of The Prairie West

An introduction to the economic, social and political evolution of the three prairie provinces from European penetration to the present.

Prerequisite: A 200-level History course.

Day division, Winter term: Three hours a week.

History 24.340★

History of Canadian Socialism since 1890

A history of the local, regional and national origins, evolution, schisms, vicissitudes of socialist practice and ideology in Canada in the twentieth century.

Prerequisite: A 200-level History course.

Day division, Winter term: Three hours a week.

F.J.K. Griezic

History 24.341★

The American Revolution

A study of the causes and course of the movement leading to the independence of the United States. Particular emphasis is given to ideology, society, local issues and revolutionary organization.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.342★

Expansion, Sectionalism and Reform: The United States, 1819 to 1850

An examination of major developments in the United States from the Panic of 1819 to the Compromise of 1850, stressing the major social and political issues arising from territorial expansion, immigration and the reform impulse.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.344

The United States in the Twentieth Century

Some principal themes in the history of the United States since 1900.

Prerequisite: A 200-level History course.

Day division: Three hours a week.

P.C. Merkley

History 24.347★

The Negro in the United States

A study of the Negro in the United States, which concentrates on his experience under slavery and the recurring themes of integration and separatism after emancipation.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.348

American Intellectual History

An examination of American thought from the colonial period to the twentieth century, with emphasis on political, social and religious ideas and their relation to American society and institutions.

Prerequisite: A 200-level History course.

Day division: Three hours a week.

P.C. Merkley

History 24.349

History of the United States Foreign Policy Since 1865

A study of the United States as a world power in its international and domestic context.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.351★

Selected Topics in Canadian History

A lecture course on a thematic area in Canadian history.

Prerequisite: A 200-level History course.

History 24.24.352★

Aboriginal Peoples of British North America to 1867

An introduction to the history of aboriginal peoples of Canada, with particular emphasis on the cultural and economic impact of contact. The attitudes of Europeans to the natives of North America and the development of British Indian policy are considered.

Prerequisite: A 200-level History course.

Day division, Winter term: Three hours a week.

K.M. Abel

History 24.353★

Aboriginal Peoples of Canada Since 1867

An examination of the history of aboriginal peoples in post-confederation Canada, with particular emphasis on the development of Canadian Indian policy and current issues regarding the Indian Act and land treaty rights.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.354

Women and North American Society

An examination of the changes that have taken place in the position of women in North America and the relationship of these changes to other social, economic and intellectual developments.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.355★

History of British Columbia

An introduction to the economic, social and political evolution of British Columbia with emphasis on the twentieth century.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.358

Society and Politics in England circa 1500-1914

An enquiry into the relationship between society and politics in England.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.359★

A History of the Habsburg Monarchy, 1526-1918

The rise and fall of the multi-national empire of the Habsburgs from the unification of Austria, Bohemia, and Hungary to the collapse of the empire in the First World War.

Prerequisite: A 200-level History course.

Day division, Fall term: Three hours a week.

F.A.J. Szabo

History 24.360

History of the U.S.S.R.

A history of the politics, diplomacy, culture and society of Soviet Russia from 1917 to the present.

Prerequisite: A 200-level History course.

Evening division: Three hours a week.

E.E. Haberer

History 24.361★

The Russian Empire

The expansion and development of the Russian Empire from the fourteenth century to 1917, with emphasis on

Siberia and Central Asia.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.365★

The Soviet Union in International Affairs from Comintern to Cold War

A study of Soviet diplomatic activity and foreign policy principles from the founding of Comintern in 1919 to the fall of Khrushchev in 1964. Attention is spread evenly over four units of study: Comintern and World Revolution (1919-28); Socialism in One Country (1929-43); Origins of the Cold War (1943-48); Global Concerns and Peaceful Co-existence (1948-64).

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.366★

Modern East Central Europe

A study of the political and diplomatic history of East Central Europe since 1848 with emphasis on Poland and Czechoslovakia.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.370

European Economic History since 1890

The economic development of contemporary Europe within the changing world economy, from the maturation of industrial capitalism to the emergence of the European Economic Community. (A knowledge of economics is not a prerequisite.)

Prerequisite: A 200-level History course.

Evening division: Three hours a week.

E.P. Fitzgerald

History 24.371★

A Selected Period in International Economic History

The political economy of international economic relations and their influence on patterns of national development in one of the following periods: (a) the mercantilist era; (b) the era of classical liberalism; (c) the Bretton Woods era.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.372★

North Africa and the Near East in the Era of Western Dominance

The political economy of Europe's commercial and colonial expansion into Mediterranean Africa and Southwest Asia.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.377

The Irish in Modern History: A Problem in Historical Ethnicism

A study of the development of the two peoples of Ireland, Anglo-Irish relations since Elizabethan times, the influence of the diaspora Irish in home affairs, and the contribution of the Irish to developments in England, Canada, the United States and other areas. Particular attention is paid to the problem of religion in Irish affairs.

Prerequisite: A 200-level History course.

Not offered 1990-91.

History 24.378★

The Reformation Era in European History, 1409-1648

A study of the papacy and the reformed churches, from the Council of Pisa to the Treaty of Westphalia. The radical changes in the relationship between church, state, and society in Western Europe during this period are examined.

(Also listed as Religion 34.378★).

Day division, Fall term: Three hours a week.

F.A.J. Szabo

History 24.380

International History, 1914-1956

A survey of international history in the first World War; peacemaking 1919-1923; inter-war diplomacy and the origins of the Second World War; the relations of the powers in the Second World War; and post-war relations and the Cold War.

Prerequisite: A 200-level History course.

Day division: Three hours a week.

R.A. Jones

History 24.385★

Twentieth-Century China

A political history of China from the 1911 Revolution to the present. Emphasis is placed on the development of Chinese communism and the Peoples Republic since 1949.

Prerequisite: A 200-level History course.

Day division, Winter term: Three hours a week.

J.W. Strong

History 24.386★

Twentieth-Century Japan

A political, intellectual and economic history of Japan in the twentieth century.

Prerequisite: A 200-level History course.

Evening division, Winter term: Three hours a week.

J. Kovalio

History 24.388

Historical Theory and Method

An examination of questions concerning the nature and value of historical enquiry and the meaning of the course of history.

Prerequisite: A 200-level History course.

Day division: Three hours a week.

M. Phillips

History 24.390

Etudes Dirigées

Un programme de lectures choisies et de travaux écrits dans le domaine de spécialisation d'un membre du département. Consultez le conseiller de Mention: français pour les sujet offerts.

For students of Mention: français only.

Permission of the Mention: français adviser required.

Precludes additional credit for History 24.391★.

History 24.391★

Etudes Dirigées

Voir History 24.390 pour description.

Permission of the Mention: français adviser required.

Precludes additional credit for History 24.390.

History 24.402

Beginnings of Early Medieval Europe and the Near East

A seminar on the transformation of the later Roman world into the polities of early Medieval Europe and the Near East. (Also listed as Classical Civilization 13.402.)

Precludes additional credit for History 24.502T2.

Prerequisite: Permission of the Department.

Not offered 1990-91.

History 24.405

Selected Problems in Medieval History

A seminar on one or more of the following topics: crime and criminal law in medieval England, heresies and social

movements, apocalyptic speculation.
Prerequisite: Permission of the Department.
Day division: Three hours a week.
J.G. Bellamy

History 24.412

Machiavelli and His Age

An intensive examination of Machiavelli's political, historical, military, diplomatic, literary and personal writing. His life and thought are explored in the context of the political, intellectual, and social issues that confronted Italians in the late Renaissance. Representative topics include: ancient political thought, the Florentine historiographical tradition, the role of the Papacy in Italian politics, the influence of Venice.

Prerequisite: Permission of the Department.

Day division: Three hours a week.

M. Phillips

History 24.416

The French Revolution

A seminar on selected problems in the history and interpretation of the French revolution, with particular reference to the development of different concepts of democracy.

Prerequisite: Permission of the Department.

Not offered 1990-91.

History 24.417

Selected Topics in the History of Eighteenth- and Nineteenth-Century France

A seminar on selected problems and issues related to the history and historiography of France in the early modern and modern period.

Prerequisite: Permission of the Department.

Evening division: Three hours a week.

R. Phillips

History 24.421

Science and Technology in the Canadian Experience

An examination of the role and relationship of science and technology, including their social and engineering applications, in the Canadian historical experience. The course is conducted as a graduate seminar with modified requirements for Honours students.

Prerequisite: Permission of the Department.

Not offered 1990-91.

History 24.422

The Maritimes in Transition, 1840s to 1890s

A seminar on social and economic themes. The course is conducted as a graduate seminar with modified requirements for Honours students.

Prerequisite: Permission of the Department.

Evening division: Three hours a week.

B.C. Buckerton

History 24.423

The Indian Peoples of Northern Canada

An ethnohistorical approach to the study of selected issues in the history of the aboriginal peoples of the subarctic. The course is conducted as a graduate seminar with modified requirements for Honours students.

Prerequisite: Permission of the Department.

Not offered 1990-91.

History 24.424

Canadian Immigration and Ethnic History

A seminar on the historical development of immigration to Canada in the nineteenth and twentieth centuries. The course is conducted as a graduate seminar with modified requirements for Honours students.

Prerequisite: Permission of the Department.

Not offered 1990-91.

History 24.425

Selected Problems in the Political Economy of Canadian Labour

A study of selected aspects in the history of Canadian labour with emphasis on the dynamics of social, economic, political and cultural change in twentieth-century Canada. The course is conducted as a graduate seminar with modified requirements for Honours students.

Prerequisite: Permission of the Department.

Not offered 1990-91.

History 24.429

Selected Topics in Greek and Roman History

Intended for Honours students in Classics or History in their Third or Fourth year. (Offered in the Department of Classics as Classical Civilization 13.429.)

History 24.430

Colonial Society in British North America

A seminar involving a comparative examination of two or more of the British North American colonies.

Prerequisite: Permission of the Department.

Day division: Three hours a week.

J.K. Johnson

History 24.431

Canada from Confederation to the Great War

A seminar examining political and social transformations of the nation-making phase of our history.

Prerequisite: Permission of the Department.

Not offered 1990-91.

History 24.432

Acadian and Quebec Society before 1763

An examination of the main political and social developments in both communities, with attention being paid to the history of France during the same period. The course is conducted as a graduate seminar with modified requirements for Honours students.

Prerequisite: Permission of the Department.

Day division: Three hours a week.

N.E.S. Griffiths

History 24.433

Selected Problems in Canadian Business History, 1850-1980

Combining extensive reading of the secondary literature with research in primary collections in the Ottawa area, this seminar focuses on central themes of business development in Canada since 1850.

Prerequisite: Permission of the Department.

Not offered 1990-91.

History 24.434

History of Northern Canada

A seminar on the regional history of the Canadian north, including the "near north" and "north of 60". Topics include native peoples, culture contact, the fur trade economy, and resource frontier development. Canadian attitudes toward

the north and the concept of Canada as a "northern nation" are also examined.

Prerequisite: Permission of the department.

Day division: Three hours a week.

K.M. Abel

History 24.435

Elites and Elite Formation in Canadian Society, 1800-1925

A historical examination of the critical role of elites in the economies of selected Canadian regions in the nineteenth and early part of the twentieth centuries.

Prerequisite: Permission of the Department.

Day division: Three hours a week.

History 24.437

Canada from War to War

A seminar on the contours of Canadian development through the crises of war, reconstruction and depression.

Prerequisite: Permission of the Department.

Day division: Three hours a week.

History 24.438

Studies in Canadian Popular Culture

Selected studies in the social history of culture in the age of mass society, including the popular arts, and the "culture of consumption".

Prerequisite: Permission of the Department.

Not offered 1990-91.

History 24.439

Modern Canada Since 1939

Selected aspects of Canadian industrialization, urbanization, unionization, federalism, regionalism, feminism, nationalist ideologies, popular culture, and class and intellectual development.

Prerequisite: Permission of the Department.

Day division: Three hours a week.

F.J.K. Griezic

History 24.440

A Selected Period in United States History

A seminar that considers the relationship among the political, social, economic and intellectual aspects of one of the following periods: (a) The American Revolution; (b) the early modern period, 1783-1816; (c) the progressive era, 1896-1912; (d) the interwar years, 1920-41; (e) since 1941. For 1990-91 the period will be (a).

Prerequisite: Permission of the Department.

Day division: Three hours a week.

P.J. King

History 24.442

North American Colonial Rebellions and Independence Movements, 1675-1837

A study of North American colonial societies through a comparative treatment of various aspects of insurrections and independence movements within the North American colonies of Great Britain and Spain from the late seventeenth to the early nineteenth centuries. The topics considered are selected from such occurrences as Bacon's Rebellion, Leisler's Rebellion, the Regulators, the American Revolution, the Mexican War of Independence and the Canadian Rebellions of 1837.

Prerequisite: Permission of the Department.

Not offered 1990-91.

History 24.443

The Religious Factor in the History of the United States

A study of the role played by religious faith in the history of the United States, with special emphasis on political ac-

tivities, the public philosophy, public policy and the American concept of national destiny.

Prerequisite: Permission of the Department.

Not offered 1990-91.

History 24.455

Selected Problems in Modern German History

A seminar on selected problems relating to the political, social, economic, cultural, and intellectual developments of German-speaking central Europe in the modern era with emphasis on the Third Reich.

Not offered 1990-91.

History 24.457

Selected Problems in Tudor and Stuart History

A seminar concentrating on aspects of English group and community organization and power in the Tudor and early Stuart period.

Prerequisite: Permission of the Department.

Not offered 1990-91.

History 24.458

Selected Problems in Nineteenth- and Twentieth-Century British Social History

A seminar primarily concerned with themes in social history.

Prerequisite: Permission of the Department.

Not offered 1990-91.

History 24.459

Selected Problems in the History of Women and the Family: from the Industrial Revolution

A seminar on selected problems relating to the changes in women's lives and in the structure of the family that have occurred since the eighteenth century. The course is concerned with one or more of the following issues: women's changing work patterns; the rise of the women's movement; changing attitudes toward childhood; changing views of sexuality. While the main focus is on Britain, North American and European experience is also examined, for comparative purposes.

Prerequisite: Permission of the Department.

Summer session 1990, Evening division.

D. Gorham

History 24.460

Selected Problems in Russian History

A seminar on selected problems relating to the expansion and decline of Imperial Russia.

Prerequisite: Permission of the Department.

Not offered 1990-91.

History 24.461

Selected Problems in Soviet History

A seminar on selected problems relating to the establishment and subsequent course of the Soviet Union.

Prerequisite: Permission of the Department.

Day division: Three hours a week.

J.W. Strong

History 24.471

Selected Problems in International Economic History

A seminar concerned with the political economy of international economic relations and their influence on patterns of historical development.

Prerequisite: Permission of the Department.

Day division: Three hours a week.

E.P. Fitzgerald

History 24.480

Selected Problems in the Diplomacy of the Great Powers, 1906-39

A seminar on selected problems in diplomatic history from the origins of the First World War.

Prerequisite: Permission of the Department.

Day division: Three hours a week.

R.A. Jones

History 24.481

Diplomatic and Strategic Problems of the Second World War

A seminar on problems selected from major politico-strategic issues of the outbreak, conduct and aftermath of the Second World War.

Prerequisite: Permission of the Department.

Not offered 1990-91.

History 24.485

Selected Problems in East-Asian History

A seminar on a selected topic in Chinese or Japanese history during the nineteenth and twentieth centuries.

Prerequisite: Permission of the Department.

Day division: Three hours a week.

J. Kovalio

History 24.490

Honours Comprehensive

A written examination, required of candidates for Honours in History and taken in the Fourth or final year. The examination deals with general questions of historical interpretation arising from the Fourth-year seminars and History 491.

Day and Evening Divisions.

History 24.491

Directed Studies

A course required of candidates for Honours in History which is taken in the Fourth or final year. It includes supervised reading and written reports in an area of history.

Day and Evening divisions.

History 24.498

Mémoire de recherche

Un travail écrit dans le domaine de spécialisation d'un membre du département. Consultez le conseiller de "Mention: français" pour les sujets offerts.

For students of "Mention: français" only.

Permission of the "Mention: français" adviser required.

Precludes additional credit for History 24.499.

History 24.499 (2 credits)

Honours Research Essay

Open to candidates for Honours in History in their Fourth year with the permission of the Department. *B+* standing in History courses is expected. The subject for research is settled in consultation with the Department and a supervisor is assigned. A written outline of the project must be submitted to the Honours Committee one week before the last day for course changes. The candidate will be orally examined upon the essay after presentation. This course carries double credit.

Precludes additional credit for History 24.498.

Courses Planned for Evening Division

Each year the Department of History offers a wide selection of courses in the Evening division at the 100, 200 and 300 levels which are as representative as possible of the fields required for the B.A. degree. At least two 400-level seminars are also offered annually in the Evening.

Dunton Tower, Room 1427
Telephone: 788-2108

Officers of Instruction

Chair
F. Loriggio

Associate Professors
F. Loriggio
C.P. Haines

Assistant Professor
G. Panico

Instructor
W. Anselmi

Supervisors of Pass and Honours Studies
C.P. Haines
F. Loriggio

General Information

Some course changes were implemented in the academic year 1989-90. Students enrolled in an Italian degree program before this year should direct their enquiries to the Pass or Honours supervisor before registration.

The Department of Italian offers a varied and flexible undergraduate program, which has been designed to comply with a range of academic and professional interests. The program offers courses and tutorials in language, literature and cultural studies, and it includes some options for translation training.

The minimum credit requirements for a degree in Italian, after the completion of Italian 26.100 or the equivalent are as follows: Pass: six; Combined Pass: five; Combined Honours: seven.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Pass Programs

The requirements for the Pass program in Italian after the completion of a 100-level credit or the equivalent are Italian 26.200, 26.240, 26.260, 26.300, 26.340 and 26.342. Both Italian 26.340 and 26.342 can be taken as requirements for the Pass program; either Italian 26.340 or 26.342 can be replaced by Italian 26.362, or 26.303★ and 26.403★. The course pattern may be varied for students who come into the program with advanced standing in Italian.

The requirements for the Combined Pass program in Italian after the completion of a 100-level credit or the equivalent are Italian 26.200, 26.240, 26.260, 26.300 and one additional credit at the 300 level. The course pattern may be

varied for students who come into the program with advanced standing in Italian.

Combined Honours Program

The minimum requirements for the Combined Honours program in Italian after the completion of a 100-level credit or the equivalent are Italian 26.200, 26.240, 26.260, 26.300, 26.340, 26.342 and one 400 level credit. Both Italian 26.340 and 26.342 can be taken as requirements for the Combined Honours program; either Italian 26.340 or 26.342 can be replaced by Italian 26.362 or 26.303★ and 26.403★ or a tutorial. The course pattern may be varied for students who come into the program with advanced standing in Italian. Only a Combined Honours program is offered by the Department of Italian. The program must be arranged with both Honours advisers concerned.

Departmental Tutorial Program

Students registered in Combined Honours in Italian and students with specialized interests in Italian studies, should examine the tutorials that the Department offers in the areas of language, literature, cultural studies. The tutorials are conducted on a one-to-one basis or in small study groups. Enquiries about the selection of tutorials should be directed to the Chairman.

Courses Offered

Italian 26.100 Introductory Italian

A course designed to introduce the student to the acquisition of Italian. Understanding, speaking, reading and writing.

Precludes additional credit for Italian 26.101★ and/or 26.102★.

Day and Evening divisions: Three hours a week and one hour practice in the laboratory.

Italian 26.101★ Introduction to Italian I

This half course introduces students to the main elements of the Italian language. It is designed to make them acquire a functional competence in elementary spoken and written Italian. Only for students with no previous knowledge of Italian. One section may be reserved for third-year architecture students planning to participate in the directed studies abroad program in Rome.

Precludes additional credit for Italian 26.100.

Day or Evening division, Fall or Winter term: Three hours a week and one hour practice in the laboratory.

Italian 26.102★ Introduction to Italian II

A half course that complements Italian 26.101★. For students wishing to acquire a better understanding of the language, and to further the acquisition process already initiated in Italian 26.101★.

Prerequisite: Italian 26.101★ or equivalent.

Precludes additional credit for Italian 26.100.

Day or Evening division, Fall or Winter term: Three hours a week and one hour practice in the laboratory.

Italian 26.200

Intermediate Italian

A sequel to Introductory Italian. Speaking, reading, writing, understanding, and using the language as a means for self-expression. A course intended to lead to the comprehension and enjoyment of Italian texts.

Prerequisite: Italian 26.100; or Italian 26.102★ or equivalent.

Day and Evening divisions: Three hours a week and one hour practice in the laboratory.

Italian 26.206★

Italian Conversation

Conversation and discussion of general and current problems, including occasional written work.

Prerequisite: Italian 26.100, or Italian 26.102★ or equivalent.

Day division, Winter term: Three hours a week.

Italian 26.240

Introduction to Italian Literature

A course designed for students who intend to enter an Italian program. Textual analysis of representative works. Prerequisite: Italian 26.200 or permission of the Department.

Day division: Three hours a week.

Italian 26.260

Introduction to the Culture of Italy

This course, taught in English, traces the major developments of Italian culture. Emphasis is placed on art, literature, music, theatre and cinema. Students enrolled in degree programs in Italian will be asked to complete assignments in Italian.

Day division: Three hours a week.

Italian 26.300

Advanced Italian

A sequel to Intermediate Italian. Defined points of grammar, style, composition; conversation and some translation. A course designed to perfect the command of Italian.

Prerequisite: Italian 26.200 or equivalent.

Day division: Three hours a week and one hour practice in the laboratory.

Italian 26.303★

Italian Grammar

A systematic study of Italian grammar. Lexicology, phonology, morphology, syntax, semantics, and contrastive grammar.

Prerequisite: Italian 26.200 or equivalent.

Day division, Fall term: Three hours a week.

Italian 26.340

Development of Literary Genres from the Thirteenth Century to the Renaissance

A historical approach to the development of literary genres from the thirteenth Century to the Renaissance.

Prerequisite: Italian 26.240 or permission of the Department.

Not offered 1990-91.

Italian 26.342

Development of Literary Genres from the Baroque to the Present

A historical approach to the development of literary genres from the Baroque to the present.

Prerequisite: Italian 26.240 or permission of the Department.

Day division: Three hours a week.

Italian 26.362

The Italian Heritage in North America

A critical survey of the Italian-Canadian and Italian-American contribution to Canadian and American culture. Works studied include novels, poetry, plays and films by such authors as: Pier Giorgio Di Cicco, Mary Di Michele, Maria Ardizzi, Marco Micone, Pietro Di Donato, Mario Puzo, John Fante, Francis Coppola, Martin Scorsese.

The course is taught in English. Students enrolled in Pass and Honours degrees in Italian will be asked to complete assignments in the Italian language.

Day division: Three hours a week.

Italian 26.401

Tutorial: Language and Dialects

A language tutorial with particular reference to the complex problems of Italian and dialects in Italy and in North America. Topic for 1990-91: *The Italian Language from the Unification to the Present*.

Prerequisite: Permission of the Department.

Italian 26.403★

Translation

This course deals with the general principles as well as with the particular problems of translation from and into Italian. Practice and exercises with literary and non-literary texts. Prerequisite: Italian 26.300 or permission of the Department.

Not offered 1990-91.

Italian 26.441

Tutorial: Literature

A tutorial on a selected author, movement or development of a particular genre. Topic for 1990-91: *The Short Story from the Thirteenth Century to the Renaissance*. Permission of the Department.

Italian 26.461

Tutorial: Contemporary Italian Culture

A tutorial on particular themes or trends of Italian culture as they have developed from the Second World War to the present.

Prerequisite: Permission of the Department.

Not offered 1990-91.

Italian 26.491

Special Studies

A tutorial on a selected language or literature or civilization topic.

Prerequisite: Permission of the Department.

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Officers of the School

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Mark Harrison
Don McGillivray
Arch McKenzie
Deborah Parnis
Bruce Paton
Susan Riley
Clyde Sanger
Barbara Shenstone
Henry Sporn
Dave Stephens

General Information

Bachelor of Journalism Honours Program

The School of Journalism offers the degree of Bachelor of Journalism with Honours. Students entering the University after Senior Matriculation complete a four-year course of 20.5 credits.

The aim of this program is not to train technologists; it is to give students the ability to investigate, interpret and communicate intelligently in any of the mass media. To this end, courses are designed to give students both professional skills and an understanding of how media function, in order that they can adapt to the various areas of modern journalism. Advantage is taken of the many resources outside the University provided by the location of the University in the national capital.

Journalism courses, with the exception of a few seminars, are offered in the Day division only. Optional courses in the four-year program, however, may be offered in the Evening division.

Bachelor of Arts in Mass Communication

The School of Journalism offers Pass and Honours Arts undergraduate programs in Mass Communication.
See p. 184.

Graduate Programs

The School of Journalism offers the Master of Journalism degree. A Master of Arts program with a specialization in communications is offered through the Institute of Canadian Studies. For further details consult the Graduate Studies and Research Calendar.

Bachelor of Journalism Honours Four-Year Program

Program Requirements

Candidates for the degree of Bachelor of Journalism take a total of 20.5 credits, normally in this sequence:

First Year

Journalism 28.100;

A French language credit*; acceptable 100-level French courses are any two of French 20.102★, 20.103★ and 20.104★; 20.108; and 20.110

Three approved optional credits.

*Students should be aware that the Department of French offers French 20.110 and two senior courses, French 20.210 and 20.310, specifically for Journalism students. Those who already have capacity in French may fulfil this requirement by passing a language test administered on an *ad hoc* basis by the Department of French, but will be required to take an approved optional credit. Students who have completed French Immersion in High School, or who have obtained a Bilingual Diploma or Certificate will be regarded as having met this French language requirement, but will be required to take an approved optional credit. Students from abroad whose mother tongue is other than English, or students whose research interests require another language, may obtain permission from the Supervisor of Undergraduate Studies to substitute this language for French.

Students should be aware of the School's requirement that, before graduation, four credits must be taken in a field other

than Journalism, with at least one of these credits at the 300 level or higher.

Second Year

Journalism 28.200 and 28.220;

An approved credit in Canadian history*, normally History 24.130, 24.233, 24.234 or 24.235;

Two approved optional credits.

*Students who expect to practice journalism in another country may be advised to choose a different history course and must seek written permission to do so from the Supervisor of Undergraduate Studies (Journalism).

Third Year

Journalism 28.351★ and 28.320 (Note: Journalism 28.320 is a two-credit course);

Three approved optional credits. These options must include at least one but may include additional Journalism credits. The courses available as options are: Journalism 28.215, 28.300, 28.305★, 28.306★, 28.321★, 28.333, 28.352★, Mass Communication 27.201, 27.280, 27.290, 27.311, 27.355★ and 27.357★. Furthermore, a student registered in a straight Journalism program should continue working toward the School's requirement that, before graduation, four credits must be taken in a field other than Journalism, with at least one of these credits at the 300 level or higher.

Fourth Year

Journalism 28.421 and 28.498;

Three approved optional credits. Students will note the School's requirement described above regarding non-Journalism courses. The Journalism options offered in Fourth year are Journalism 28.410★, 28.411★ and 28.490.

Combined Honours

Honours programs may be taken by students in the four-year undergraduate program in which Journalism is combined with other disciplines by arrangement. The minimum requirements are normally the same as those for the Bachelor of Journalism with Honours, with the exception that students in Combined Honours programs may write their graduating research paper for either of the participating departments. The degree obtained (Bachelor of Journalism or Bachelor of Arts with Honours) depends upon the department for which a student writes the graduating research paper. Nevertheless, *Combined Honours programs in Journalism and other disciplines are available only to students registered in Journalism.*

Students in Combined programs are required to complete 20.5 credits, but are excused from the 300- and 400-level Journalism options required for the Honours program.

Combined Honours, Journalism and Economics

See p. 105 and consult the Department of Economics.

Combined Honours, Journalism and English

See p. 114 and consult the Department of English Language and Literature.

Combined Honours, Journalism and French

See p. 125 and consult the Department of French.

Combined Honours, Journalism and Mass Communication

See p. 184.

Combined Honours, Journalism and Political Science

See p. 205 and consult the Department of Political Science.

Combined Honours, Journalism and Law

Course requirements are:

1. Journalism 28.100, 28.200, 28.220, 28.320, 28.351★, 28.421 and, if the Honours degree sought is the Bachelor of Journalism, Journalism 28.498; *Note: Journalism 28.320 is a two-credit course*

2. Combined Honours students will complete at least six but normally not more than nine Law credits, or their equivalent, according to the following prescribed pattern:

- (a) Law 51.100 with a minimum grade of C+;
- (b) two of Law 51.203, 51.204 or 51.205 with a grade-point average of 6.0 (C+);
- (c) at least one Law credit at the 300 level or higher;
- (d) at least one other Law credit at the 400 level or higher; and
- (e) an Honours essay in Law (51.498), or a designated equivalent, or an Honours essay in Journalism; (when the Honours essay is in Journalism, students are required to take an additional Law credit at the 300 or 400 level.)

3. A French language credit; acceptable 100-level French courses are any two of French 20.102★, 20.103★ and 20.104★; 20.108; and 20.110.

4. An approved credit in Canadian history. (Students who plan to practice journalism in another country may be advised to choose a different History course and must seek permission to do so from the Supervisor of Undergraduate Studies, Journalism.);

5. At least one introductory or survey credit in a Social Science as may be approved by the Department of Law.

6. Approved options to make up a program total of 20.5 credits.

Combined Honours, Journalism and Philosophy

Course requirements are:

1. Journalism 28.100, 28.200, 28.220, 28.320, 28.351★, 28.421 and, if the Honours degree sought is the Bachelor of Journalism, Journalism 28.498; *Note: Journalism 28.320 is a two-credit course*

2. Seven credits in Philosophy, including: an introductory course or equivalent; six credits beyond the 100 level to include:

- (a) two credits in the history of philosophy;
- (b) Philosophy 32.280 or 32.290;
- (c) one credit at the 400 level.

3. A French language credit; acceptable 100-level French courses are any two of French 20.102★, 20.103★ and 20.104★; 20.108; and 20.110.

4. An approved credit in Canadian history. (Students who plan to practice journalism in another country may be advised to choose a different History course and must seek permission to do so from the Supervisor of Undergraduate Studies, Journalism.);

5. Approved options to make up a program total of 20.5 credits.

Combined Honours, Journalism and Sociology

Course requirements are:

1. Journalism 28.100, 28.200, 28.220, 28.320, 28.351★, 28.421 and, if the Honours degree sought is the Bachelor of Journalism, Journalism 28.498; *Note:* Journalism 28.320 is a two-credit course.

2. Sociology 53.100 or Anthropology 54.100 or Sociology-Anthropology 56.100; Sociology 53.203 or Anthropology 54.203; (Mass Communication 27.201 can be substituted for Sociology 53.203 or Anthropology 54.203); Sociology 53.370; Sociology-Anthropology 56.305 or Sociology 53.306 (if the Honours Essay is written in Sociology, Sociology 53.306 is recommended); if the Honours Essay is written in Sociology, Sociology 53.495 or 53.498, one credit at the 400 or 500 level and one additional credit beyond the 100 level in Sociology and/or Anthropology (not including Sociology-Anthropology 56.211); if the Honours Essay is written in Journalism, one credit at the 400 or 500 level and two additional credits beyond the 100 level in Sociology and/or Anthropology (not including Sociology-Anthropology 56.211).

3. A French language credit; acceptable 100-level French courses are any two of French 20.102★, 20.103★ and 20.104★; 20.108; and 20.110.

4. An approved credit in Canadian history. (Students who expect to practice journalism in another country may be advised to choose a different History course and must seek permission to do so from the Supervisor of Undergraduate Studies, Journalism.);

5. Approved options to make up a program total of 20.5 credits.

B.J. Honours with a Concentration in Psychology

Note:

The following course pattern does not constitute a Combined Honours program in Journalism and Psychology.

Course requirements are:

1. Journalism 28.100, 28.200, 28.220, 28.320, 28.351★, 28.421, 28.498; *Note:* Journalism 28.320 is a two-credit course.

2. Psychology 49.100, 49.200, two of 49.210★, 49.220★, 49.230★, 49.250★, 49.260★, 49.270★; two credits in Psychology chosen in consultation with members of the Department from Psychology courses in the areas of behavioral neuroscience, community and social psychology, perception and cognition, developmental psychology, or personality and assessment; and one optional credit in Psychology.

3. A French language credit; acceptable 100-level French courses are any two of French 20.102★, 20.103★ and 20.104★; 20.108; and 20.110.

4. An approved credit in Canadian history. (Students who expect to practice journalism in another country may be advised to choose a different history course and must seek permission to do so from the Supervisor of Undergraduate Studies, Journalism.);

5. Approved options to make up a program total of 20.5 credits.

Admission, Continuation and Graduation**Admission and Continuation**

For admission to the First year, students are required to present:

The Ontario Secondary School Diploma, or the equivalent, including six Ontario Academic Courses (OACs) with a minimum average of 65 percent; or the Ontario Secondary School Honour Graduation Diploma or the equivalent, with a minimum average of 65 percent; or the successful completion of Qualifying-University year.

Although not required for admission, an OAC in English is recommended.

It should be noted that the number of student spaces in the School is limited. Because of this it may not be possible to grant admission to all applicants who meet the foregoing requirements. Admission will therefore be on a selective basis with preference given to those candidates who show the highest promise of success in the course.

Admission to Second year will be guaranteed only to First-year Journalism students who achieve a minimum *B-* in Journalism 28.100 and who maintain a 7.0 overall grade-point average in First year (calculated on five credits, including failures).

Students may normally be permitted to transfer into Second-year Journalism when spaces are available, provided they have a minimum *B-* average in their First year and provided they make up First-year Journalism requirements.

Students may not continue into 300-level or higher courses without satisfactory standing. Admission to these courses will be based on a minimum of:

- (a) *C* standing in Journalism 28.220;
- (b) an average of *C+* in the three Journalism subjects taken for credit in the first two years: Journalism 28.100, 28.200 and 28.220;
- (c) an overall grade-point average of 4.0.

Note:

Journalism students must become reasonably proficient in computer keyboarding as soon as possible. Most assignments in the professional Journalism courses are done by computer.

Graduation Requirements

In order to graduate, students must fulfil all University regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all School regulations.

In addition to the graduation requirements of the Faculty of Arts, a candidate for the degree of Bachelor of Journalism with Honours must have a *C+* average in the Journalism courses, with *C* grades or better in the reporting courses, a minimum *C-* in each other Journalism course, and be recommended for graduation by the School.

If, after the regular examinations in any year, a student is below the standard, grades must be raised in the appropriate subjects by writing grade-raising examinations.

Courses Offered

Journalism 28.100

Introduction to Journalism Studies

An introduction to the social and philosophical contexts of

journalism, followed by an outline of its development in Europe, the United States and Canada. In the Winter term, the course introduces students to the basics of reporting the news. Lectures, readings and workshops explore how journalists gather information and prepare news reports for newspapers, radio and television.

Prerequisite: For Journalism Honours students only.

Day division: Lectures and discussion groups three hours a week.

Journalism 28.200

Problems of the Mass Media

A historical and contemporary examination of mass media problems including ownership structure, monopoly, government control, freedom and secrecy, responsibility and ethics, public opinion, propaganda, copyright, censorship in war and peace.

Prerequisite: Journalism 28.100 or Mass Communication 27.111.

Day division: Three hours a week.

Journalism 28.215

The Documentary

This course examines the work of individual film makers, of documentary styles, and of organizations and institutions in the context of the history of documentary film making, including documentaries made for television. Non-fiction films other than documentaries may be considered. (Also listed as Film Studies 19.215.)

Prerequisite: Film Studies 19.100 or permission of the School.

Day division: Lecture and screening three hours, lecture one hour.

Journalism 28.220

Fundamentals of Reporting

The collection and presentation of news, for print, radio and television media. This is mainly a practical course, based on workshop and newsroom assignments.

Prerequisites: For Second-year Honours Journalism students and transfer students.

Day division: Lectures and workshops six hours a week.

Journalism 28.300

The Modern Environment

A seminar course for Journalism students in which a number of texts drawn from the social sciences, literature, journalism and philosophy are considered for their contributions to an understanding of contemporary society and the issues that provide the background to much of contemporary journalism.

Prerequisites: Journalism 28.100 or Mass Communication 27.111 and Journalism 28.200 or permission of the School.

Journalism 28.305★

International Media Systems

This course is concerned with the flow of world news — how it is collected, transmitted, received, selected, edited and distributed; how it informs or inhibits our views of the world around us. It examines the relationship and dependence of Canadian media on regional and international institutions and systems. It examines such items as media systems; the role of international news agencies; the role of global telecommunication systems; the foreign news-gathering operations of national radio and television networks, and the inter-network arrangements for news distribution; the role of supranational media institutions such as UNESCO, the International Press Institute, the Inter-American Press Association and the International Organization of Journalists; the role of regional distribution agencies such as Intervision, Eurovision, European Broad-

casting Union, Asian Broadcasting Union. (Also listed as Mass Communication 27.305★.)

Prerequisite: One of Journalism 28.100, 28.200, Mass Communication 27.111, 27.211 or permission of the School.

Journalism 28.306★

Comparative Media Studies

This course is concerned with comparisons of media content, organization or operation. Comparisons may be cross-cultural in nature (i.e. comparisons of English and French-Canadian media content), cross-media (i.e. comparisons of broadcast and print media organizations), cross-national (i.e. comparisons of media operations in various countries) or a mixture of these. There may also be comparisons over time. Some time is spent examining and employing research tools and methods used in these studies. (Also listed as Mass Communication 27.306★.)

Prerequisite: One of Journalism 28.100, 28.200, Mass Communication 27.111, 27.211 or permission of the School.

Journalism 28.320 (2 credits)

Advanced Reporting and Editing

The course covers advanced work in TV, radio and print media. Under staff supervision, students report and edit for a community newspaper, report and produce for radio news and television news, and engage in depth reporting.

Prerequisite: Journalism 28.220.

Day division: Day-long workshops once a week plus approximately 30 hours of newsroom work a term.

Journalism 28.321★

Career Seminars

An opportunity for the student to specialize by doing work in such areas as television, radio, magazines, public relations, creative writing, editorial writing, freelancing, the film, or reporting in the French language. Certain of these specialties may not be offered in a given year.

Prerequisite: For Third- and Fourth-year students only.

Day division: Annually, as required; two hours alternate weeks all year.

Journalism 28.333

Film and Society

An examination of film in relation to social and intellectual developments of the twentieth century. The ways in which the cinema has both shaped and been shaped by some of these developments are considered. (Also listed as Film Studies 19.333.)

Prerequisite: For Third- and Fourth-year students or permission of the School.

Journalism 28.351★

Communications Law I

This course is concerned with the general laws governing the mass media in Canada with attention to their effect on freedom of expression. Specific topics for examination include: the development of freedom of expression and of the press in Canadian constitutional law, including the effects of the Charter of Rights and Freedoms; statutory limits on freedom of expression and of the press; contempt of court; civil defamation; and privacy. (Also listed as Law 51.351★ and Mass Communication 27.351★.)

Prerequisite: Journalism 28.100, Law 51.100 or Mass Communication 27.111 or permission of the School.

Day division, Fall term: Lectures and discussions three hours a week.

Journalism 28.352★

Communications Law II

The law as it affects the Canadian broadcasting and communications industry. The primary focus of the course is on the operations of the Canadian Radio-Television and Telecommunications Commission. Specific topics for examination may include: administrative formulation of policy; multiple, monopoly and foreign ownership; control of program content (violence, obscenity, "good taste," food and drug commercials, liquor advertising, indirect censorship); controlling program quality; the provision of a right of access to the media; cablevision licensing and control; alternative sanctions. (Also listed as Law 51.352★ and Mass Communication 27.352★.)

Prerequisite: Journalism 28.100, Law 51.100 or Mass Communication 27.111 or permission of the Department of Law. Evening division, Winter term: Lectures and discussion three hours a week.

Journalism 28.410★

Special Topic

An examination of a topic in journalism not covered in depth in other courses. Topics may change from year to year.

Journalism 28.411★

Special Topic

An examination of a topic in journalism not covered in depth in other courses. Topics may change from year to year.

Journalism 28.421

Specialized Reporting

An opportunity for students to specialize by acquiring background and undertaking assignments in all media in various specialized areas, such as science and technology, business and finance, sports, the arts, international affairs, Canadian politics and government, social welfare. Certain of these specialties may not be offered in a given year.

Prerequisite: Journalism 28.320.

Day division: Three hours a week.

Journalism 28.490

Honours Tutorial

Students are asked to analyze some of the major achievements in contemporary journalism. They work individually and in groups in presenting research papers. Students are also given the opportunity to acquire background and experience in the managerial aspects and production of print and broadcast journalism.

Prerequisite: Journalism 28.320.

Journalism 28.498

Honours Research

Students in this course have to carry out directed research and prepare a project under faculty supervision. The deadline for completion of the Honours research project is April 1.

Prerequisite: For B.J. Honours students only.*

Day division.

*Students should refer to general Faculty of Arts regulations regarding submission of Honours Essays (p. 61).

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Officers of Instruction

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Supervisor of Honours Studies

A.J. Hunt

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Professors

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G. S. Goodwin-Gill

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M.H. Ogilvie

Associate Professors

S.B. Boyd

R.L. Campbell

P.J. Davidson

M.H. Davies

D.W. Elliott

J.A. MacKenzie

M. Mac Neil

C.N. Mitchell

W.W. Pue

C.N. Sargent

R.P. Saunders

D. Wayand

Assistant Professors

A. Bartholomew

T.B. Dawson

R. Mohr

P. Swan

J.B. Wright

Adjunct Professor

K.G. McShane

Sessional Lecturers

J. Barnes

C. Bartels

S. Benzvy-Miller

N. DeClerq

D. George

J. Gilhooly

C. Harris

C. Jaekl

J. Marshall

A. McChesney

J. O'Reilly

A. Scholberg

I. Stauffer

V. Steeves

B. Thompson

R. Tourangeau

J. Wilson

P. Wright

General Information

The Department of Law provides a unique forum for the study of law in an interdisciplinary environment. Emphasis is placed on an approach that views law as a social phenomenon, and that situates the study of legal structures, rules and institutions within their social, economic and political context. Consistent with its location in the Faculty of Social Sciences, the Department of Law is characterized by an approach to the study of law that is firmly rooted in the social science tradition of enquiry.

The Department does not attempt, in any manner, to offer a "pre-law" program for students intending to pursue professional vocational training in law schools. Nor does completion of courses or programs qualify anyone to practise law or give counsel in legal matters. The interdisciplinary and social sciences perspectives on legal issues offered in the Department's courses do serve as valuable background to a wide variety of career pursuits, including professional and administrative areas as well as supporting further academic studies.

The Department of Law offers programs leading to both Pass and Honours degrees in Law. Students may also undertake the study of law in a Combined Pass or Honours program in conjunction with another discipline.

Transition Provisions

The Department of Law introduced a revised program in 1985-86. Students who first registered in a Pass or Honours program in a session prior to 1985-86 may proceed under either the old or new requirements. Students who first registered in a Pass or Honours program in 1985-86 or later must complete the new program requirements. Students in doubt about their status should consult the Registrar or the Pass or Honours Advisers in Law.

Students under the old program requirements who have not completed required courses that are no longer offered (Law 51.101★, 51.102★ or 51.200) must arrange appropriate course equivalents by contacting the Department Chairperson.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Introduction

In the following program descriptions: (a) the term "course" means full credit course; (b) the term "normally" indicates that the formal requirements can only be waived by express permission of the Department in exceptional circumstances and on special written application.

Notes:

Students in any Law program cannot include Law 51.231★, 51.232★, Business 42.261★ or 42.262★ towards the fulfilment of their degree requirements, even as options.

Note that the number of student spaces in the Law program

is limited. Thus, it may not be possible to grant admission to all applicants who meet the basic admission requirements. Admission will, therefore, be on a selective basis with preference given to those candidates who show the highest promise of success in the program.

Applications for admission into Law programs must be made by May 15 of the academic year preceding admission.

Pass Program

The Pass program is governed by the following regulations:

1. All Pass programs must be approved by the Department after consultation with the Supervisor of Pass programs or some other member of the Department specifically designated for that purpose.
2. A Pass degree in Law requires at least six but normally not more than nine Law credits or their equivalent according to the following prescribed pattern:
 - (a) Law 51.100 with a minimum grade of C-; and
 - (b) Two of Law 51.203, 51.204 or 51.205; and
 - (c) At least three additional Law credits.
3. Students must either:
 - (a) have taken Law 51.100 or its equivalent and normally obtained a grade of C- or better at the time of declaring a Law Major; or
 - (b) include Law 51.100 or its equivalent in their program immediately after declaring a Law Major and normally obtain a grade of C- or better in it.
4. In addition to the Law credits, Pass students must normally take at least three approved credits in one other discipline.
5. Students in the Pass program must satisfy the general University regulations for Pass programs.

Note:

The attention of Pass program students is drawn to the requirement that any change in their program must be expressly approved by the departmental Supervisor of Pass programs and that this approval must not be presumed. Failure to heed the departmental Supervisor's advice may result in the student's ineligibility for certain advanced and graduate courses and programs or ineligibility to graduate.

Combined Pass Program

The Combined Pass program is governed by the following regulations:

1. All Combined Pass programs must be approved by the Department after consultation with the Supervisor of Pass programs or some other member of the Department specifically designated for that purpose.
2. Combined Pass students will complete at least five, but normally not more than seven Law credits or their equivalent according to the following prescribed pattern:
 - (a) Law 51.100 with a minimum grade of C-; and
 - (b) Two of Law 51.203, 51.204 or 51.205; and
 - (c) At least two further Law credits.
3. Students whose other discipline in a Combined Pass program is not in the Faculty of Social Sciences must take at least one introductory or survey credit in a Social Science as may be approved by the Department.

4. Combined Pass students must normally obtain a grade of C- or better in Law 51.100, or in the combination of its prescribed equivalent.

5. Students in the Combined Pass program must satisfy the general University regulations governing B.A. Pass programs.

6. All transitional arrangements governing entry into a Combined Pass program in previous issues of the Calendar are revoked.

Note:

The attention of Combined Pass program students is drawn to the requirement that any change in their program must be expressly approved by the departmental Supervisor of Pass programs and that this approval must not be presumed. Failure to heed the departmental Supervisor's advice may result in the student's ineligibility for certain advanced and graduate courses and programs or ineligibility to graduate.

Honours Program

The Honours program is governed by the following regulations:

1. All Honours programs must be approved by the Department after consultation with the Supervisor of Honours or some other member of the Department specifically designated for that purpose.
2. An Honours student must complete a minimum of 20 credits, including at least nine and normally not more than 12 Law credits or their equivalent according to the following prescribed pattern:
 - (a) Law 51.100 with a minimum grade of C+; and
 - (b) Law 51.203, 51.204 and 51.205 with an average grade of C+ or better; and
 - (c) Law 51.397*; and
 - (d) An Honours essay in Law (51.498), which includes a mandatory weekly workshop during Fall term of first registration; and
 - (e) Two additional Law credits at the 400 level or higher; and
 - (f) At least one and one-half additional Law credits.
3. Honours students normally must have taken Law 51.100 or its equivalent before entering the Honours program and have obtained a grade of C+ or better.
4. Honours students:
 - (a) will normally have completed 14 credits towards their Honours B.A. in law, must have an average of at least a C+ in their required 200-level courses and received written acceptance by a faculty supervisor before they may register in Law 51.498.
 - (b) should consult as early as possible with the Honours Supervisor regarding the process for registration in Law 51.498.
 - (c) must obtain a grade of B- or better in their Honours Essay in Law 51.498.
5. In addition to the Law credits, Honours students must normally take at least three approved credits in one other discipline.
6. Students in Honours programs must satisfy the general University regulations for B.A. Honours programs.

Note:

Attention of Honours students is drawn to the requirement that any change in their program must be expressly ap-

proved by the departmental Supervisor of Honours and that this approval must not be presumed. Failure to heed the departmental Supervisor's advice may result in the student's ineligibility for certain advanced and graduate courses and programs or ineligibility to graduate.

Combined Honours Program

The Combined Honours program is governed by the following regulations:

1. All Combined Honours programs must be approved by the Department after consultation with the Supervisor of Honours or some other member of the Department specifically designated for that purpose.
2. Combined Honours students must complete a minimum of 20 credits.
3. Combined Honours students will complete at least six but normally not more than nine Law credits, or their equivalent according to the following prescribed pattern:
 - (a) Law 51.100 with a minimum grade of C+; and
 - (b) Two of Law 51.203, 51.204 or 51.205 with an average grade of C+ or better; and
 - (c) Law 51.397★; and
 - (d) An Honours essay in Law (51.498), or a designated equivalent, or an Honours essay in the other discipline; (when the Honours essay is in the other discipline students are required to take an additional Law credit at the 300 or 400 level); and
 - (e) At least one and one-half additional Law credits, including at least one credit at the 400 level or higher.

Note:

Honours Essay (Law 51.498) includes a mandatory weekly workshop during Fall term of first registration.

4. Students whose other discipline in a Combined Honours program is not in the Faculty of Social Sciences must take at least one introductory or survey credit in a Social Science as may be approved by the Department.
5. (a) Applicants for Combined Honours normally must have obtained a grade of C+ or better in Law 51.100 or its equivalent before entering the Combined Honours program.
- (b) Combined Honours students will normally have completed 14 credits towards their Honours B.A., must have obtained an average of at least C+ in their two 200-level Law courses, and have received written acceptance by a faculty supervisor before they may register in Law 51.498.
- (c) Combined Honours students should consult as early as possible with the Honours Supervisor regarding the process for registration in Law 51.498.
6. Students in a Combined Honours program must have obtained a grade of B- or better in their Honours Essay in Law (51.498), or in the designated equivalent.
7. Students in a Combined Honours program must satisfy the general University regulations for B.A. Honours programs.
8. Where the Combined Honours program is with the School of Journalism, and the Honours Essay is done in Journalism, the degree awarded will be the Honours Bachelor of Journalism with Law. Students are directed to the regulations of the School of Journalism, which include a requirement of 20.5 credits in four years.

Note:

The attention of Combined Honours students is drawn to

the requirement that any change in their program must be expressly approved by the departmental Supervisor of Honours and that this approval must not be presumed. Failure to heed the departmental Supervisor's advice may result in the student's ineligibility for certain advanced and graduate courses and programs or ineligibility to graduate.

Criminology and Criminal Justice Concentration

For details see p. 102.

Off-Campus Courses

Introductory Law courses may be offered off-campus by the Department of Law. The particular course(s) offered and location(s) will be announced well in advance of the period of registration.

Prerequisites

The attention of students is drawn to the fact that many Law courses have designated prerequisites. In some instances "permission of the Department" is an alternative to the specified prerequisite. It must not be presumed that such permission will be granted automatically; and it may be granted subject to certain conditions, including the fulfillment of preliminary reading requirements or the submission of some written work.

Cross-listed Courses

Students should note that the Department of Law will normally regard a cross-listed course as a credit in the department in which the student registers. Students are advised to consult with the relevant departments before deciding under which department they should register in cross-listed courses.

Courses Offered

Note:

A star (★) following a course number indicates a half-credit course.

Law 51.100

Introduction to Legal Studies

An introduction to law and the Canadian legal system. Topics include an examination of the nature and functions of law; concepts and sources of law, and the relationship between law and social change; historical and constitutional foundations of the Canadian legal system; the common law and civil law traditions; legal institutions and methods; statutory interpretation and precedent; role of judges, lawyers and lay persons; effectiveness and accessibility of the legal system; alternatives to the court process as a mechanism for dispute resolution.

Day and Evening divisions: Lectures three hours a week, mandatory group workshops one hour a week.

A. Bartholomew, P.J. Fitzgerald, D. Fraser, C. Mitchell, W. Pue, P. Swan, B. Wright

Note:

Law 51.100 and the combination of Law 51.101★ with 51.102★ (no longer offered) are equivalent and only one of them may be taken for credit.

Law 51.203

Introduction to Private Law Relationships

This course examines the origins and scope of modern private law relationships. Values espoused by such concepts as legal personality, property and obligations arising from contracts, torts and the law of restitution will be studied. The interaction of various private law categories and the role of the state in ordering private relations will be emphasized.

Prerequisite: Law 51.100 or permission of the Department.
Day or Evening division: Lectures and discussions three hours a week.

R.L. Campbell, P.J. Davidson, B. Dawson, M. Mac Neil, M.H. Ogilvie, C.N. Sargent, P. Swan

Law 51.204

An Introduction to Criminal Law in Context

Canadian criminal process; the nature and purpose of criminal law; the criminal act as distinguished from civil wrong; the origin and development of contemporary principles and procedures, the various categories of criminal conduct. The role of enforcement agencies and of the courts in the administration of criminal law. Methods of criminal correction. Introduction to the study of the relationship between criminal activity and deviant behaviour.

Prerequisite: Law 51.100 with a minimum grade of C- or permission of the Department.

Day and Evening divisions: Lectures and discussions three hours a week.

C. Mitchell, R. Mohr, R. Saunders, B. Wright

Note:

Students who have obtained credit for Law 51.234 (no longer offered) cannot also obtain credit for Law 51.204.

Law 51.205

Introduction to Public Law

This course examines the law relating to the state and the state's relationship to other legal persons. Basic principles of constitutional law, administrative law and selected other areas of public law are dealt with. Themes include the special features and problems of public law, implications of the expanded new role of modern governments, and legal and alternative processes in public law.

Prerequisite: An introductory course in Political Science or Law 51.100 (or its equivalent) or permission of the Department.

Day and Evening divisions: Lectures and discussion three hours a week.

Law 51.300★

The Legal Process

This course explores advanced topics in the legal process such as the nature and function of law, dispute resolution and law-making.

Prerequisites: Law 51.100 (or its equivalent) and any two of Law 51.203, 51.204 or 51.205, or permission of the Department.

Seminars three hours a week.

Note:

Students who have obtained credit for Law 51.200 (no longer offered) cannot also obtain credit for Law 51.300★.

Law 51.301★

Women and the Legal Process

This course examines the manner in which the legal process has affected the status of women. Areas of concentration within the Canadian context include the criminal law, citizenship and immigration, education, employment, and welfare and social services.

Prerequisite: Law 51.100 or Women's Studies 09.188 or 09.288 and at least Third-year standing, or permission of the Department.

Lectures and discussions three hours a week.

Law 51.302★

Canadian Legal Professions

An introduction to the concept of professionalism, the particular characteristics of the Canadian legal professions, the role of lawyers in society and the future of legal professionalism.

Prerequisites: Completion of Law 51.100 and any one of Law 51.203, 51.204 or 51.205; or permission of the Department.

Not offered 1990-91.

Law 51.303★

Contracts

This course explores in depth some aspects of the contractual relationship. Basic doctrines and precepts are studied and an assessment made of their rationale and efficiency. The role of contracts as a means of economic and social control is considered. Such issues as the interests protected by contract law, the most suitable remedies and the increasing influence of legislation on the ordering of contractual relations are also addressed.

Prerequisite: Law 51.203 or permission of the Department.

Lectures and discussions three hours a week.

M.H. Ogilvie

Law 51.305★

Law and Regulation

This course explores definitions and goals of regulation, the instruments through which regulation is pursued, and why it takes particular forms. Regulation is treated as a pervasive phenomenon that cuts across a number of dichotomies such as public/private, legal/political, legislative/administrative, etc. Particular forms of regulation to be considered may include contracting, tort liability, standard setting, rate fixing, resource allocation, welfare and social benefit conferral.

Prerequisite: Law 51.203 or 51.205 or permission of the Department.

Not offered 1990-91.

Law 51.311★

Philosophy of Law: The Nature of Law

This course examines the concept of law, leading theories of law and related concepts such as rules and obligations, power and authority, coercion, and justice. (Also listed as Philosophy 32.311★.)

Prerequisites: Law 51.100 and one of Law 51.203, 51.204 or 51.205; or permission of the Department.

Fall term: Lectures and discussions three hours a week.

P.J. Fitzgerald

Note:

Students who have obtained credit for Law 51.310 (Philosophy 32.350) (no longer offered) cannot also obtain credit for Law 51.311★ (Philosophy 32.311★).

Law 51.312★

Philosophy of Law: The Logic of the Law

This course examines the nature of legal reasoning and

analyzes concepts particularly used in the course of legal reasoning such as rights and duties, ownership and possession, liability and punishment. (Also listed as Philosophy 32.312★.)

Prerequisite: Law 51.311★ or permission of the Department.

Lectures and discussions three hours a week.

Note:

Students who have obtained credit for Law 51.310 (Philosophy 32.350) (no longer offered) cannot also obtain credit for Law 51.312★ (Philosophy 32.312★).

Law 51.315

Theory of Law and Politics

A study of the interrelated theories of law and politics, as they are treated by prominent thinkers and by important schools of thought and as they have manifested themselves in various legal and political institutions throughout history. Topics of investigation include law and ethics, justice and equity, positivism and natural law, state absolutism and positive law, the political background of past codifications as well as anthropological and historical theories of law and society.

Prerequisites: Law 51.100 and one of Law 51.203, 51.204, 51.205; or Political Science 47.100 and 47.230; or permission of the Department.

Lectures and discussions three hours a week.

D. Wayand

Note:

Students who have obtained credit for Law 51.210 (no longer offered) cannot also obtain credit for Law 51.315.

Law 51.316★

Sociology of Law

This course offers an introduction to and overview of the sociology of law. The development of sociology of law is located in sociology's wider concerns with the distinctive features of modernity, the West and capitalism. These themes are explored through the writings on law of Durkheim (changing forms of social solidarity, rise of restitutive law, contract), Weber (formal rationality, legal rationalisation, economic calculation) and Marx (law, state and coercion, legal form/commodity form). The course outlines the way in which these themes have influenced the subsequent development of the sociology of law. (Also listed as Sociology 53.381★.)

Prerequisite: One of Law 51.203, 51.204, or 51.205, or permission of the Department.

Hours to be arranged.

A. Hunt

Law 51.321★

Legal Organization of Economic Units

This course examines the forms of carrying on economic activity. The legal existence, identity and structure of proprietorship, partnership, corporation and Crown entity are discussed. The rights and obligations of such economic units both internally and in relationship with other persons are analyzed. The relationship between legal form and economic function and the role of state regulation is also considered.

Prerequisite: Law 51.203 or permission of the Department.

Lectures and discussions three hours a week.

R.L. Campbell

Note:

Students who have obtained credit for Law 51.321 (no longer offered) may not also obtain credit for Law 51.321★.

Law 51.323★

The Legal Nature of Property

An examination of the nature and functions of property as a legal and social institution, with particular reference to theories of property, the scope of property interests, and the relationship between individual property rights and the state.

Prerequisite: Law 51.203 or permission of the Department.

Lectures and discussions three hours a week.

Note:

Students who have obtained credit for Law 51.323 (no longer offered) may not also obtain credit for Law 51.323★.

Law 51.324

Tax Law and Policy

An introduction to federal income taxation, both personal and corporate, and a review of the Canadian tax system generally with some reference to the development, implementation and enforcement of tax policy.

Prerequisite: Law 51.203 or 51.220 or 51.232★ or permission of the Department.

Not offered 1990-91.

Law 51.325★

Consumer Law

This course examines the need for consumer protection in the provision of goods and services, and investigates the traditional legal protection afforded by statute and common law, the legislative response to consumer pressures and the judicial response in recent Canadian, English and American law. In addition, reform of consumer law is considered.

Prerequisite: Law 51.203 or 51.220 or 51.232★ or Business 42.262★ or permission of the Department.

Not offered 1990-91.

Note:

Students who have obtained credit for Law 51.325 (no longer offered) cannot also obtain credit for Law 51.325★.

Law 51.326★

Banking Law

This course examines the law relating to banks and banking. Particular emphasis is placed on the nature of the legal relationship created and on the legal rights and duties of the parties involved. Areas studied include the consumer and corporate aspects of banking (including computerization and electronic fund transfers) as well as the regulation of banking.

Prerequisite: Law 51.203 or 51.220 or 51.232★ or Business 42.262★ or permission of the Department.

M.H. Ogilvie

Law 51.327★

International Economic Law: Trade and Investment

A general introduction to the legal aspects of foreign trade and investment. Topics may include: the international sale of goods and related issues of finance of transnational transactions, international carriage of goods, insurance, agency and trading houses; other forms of trade, e.g., counter-trade; foreign investment including transfer of technology and joint ventures; and dispute settlement of international disputes by litigation and arbitration.

Prerequisite: Law 51.203 or 51.232★ or Business 42.262★ or permission of the Department.

Note:

Students who have obtained credit for Law 51.322 (no longer offered), may not also obtain credit for Law 51.327★.

Law 51.328★**International Economic Law: International Regulation**

A study of international regulation of trade and investment through such mechanisms as bilateral, regional and multi-lateral treaties and agreements. Topics may include: The General Agreement on Tariffs and Trade; the European Economic Community; the United Nations Conference on Trade and Development; intergovernmental commodity agreements; the International Monetary Fund; the World Bank and others.

Prerequisite: Law 51.203 or 51.205 or permission of the Department.

Note:

Students who have obtained credit for Law 51.322 (no longer offered), may not also obtain credit for Law 51.328★.

Law 51.333★**Injury, Compensation and the Law**

This course focuses on the problems of injury and compensation. Varying legal responses to these problems are examined in their economic, historical, comparative, political, philosophical or sociological contexts. Particular concerns include definitions of personal injury, the objectives and effectiveness of legal intervention, varying forms of compensation and the relation between private law and state regulation.

Prerequisite: Law 51.203 or permission of the Department. Lectures and discussions three hours a week.

Note:

Students who have obtained credit for Law 51.333 (no longer offered) may not also obtain credit for Law 51.333★.

Law 51.335★**Law, Crime and Society in Historical Perspective**

The course introduces students to the history of the relationship between the criminal law system and society. Changing issues in the criminal law and the nature of institutional responses are examined, covering medieval to early nineteenth-century England and nineteenth to early twentieth-century Canada.

Prerequisite: Law 51.204 or permission of the Department. Day or Evening divisions: Lectures and discussion three hours a week.

Law 51.336★**Criminal Law: Process and Politics**

This course examines the issues and concerns surrounding criminal law process in Canada. The structure and use of the process is studied, in order to examine its fairness, its defects, and possible reform initiatives. In particular, issues concerning gender, race and class bias in the implementation and application of the criminal law are examined.

Prerequisite: Law 51.204 or permission of the Department. Lectures and discussion three hours a week.

Law 51.337★**Young Offenders and the Law**

A review of the Young Offenders Act within the framework of the Canadian justice system, with particular emphasis on historical and philosophical developments and objectives. Current topics include: constitutional issues, procedure, confessions, transfers, sentencing options, alternative measures, reviews, and possible amendments.

Prerequisite: Law 51.204 or permission of the Department. This course may not be taken by students who completed Law 51.493★ in 1987-88.

Hours to be arranged.

Law 51.341★**Employment Law**

This course investigates the legal regulation of the employment relationship. It comprises a study of the contractual basis and the significant statutory regulation of the relationship. Particular questions such as who is an employee, and what are the rights and duties of the employee and the employer in creating, carrying out and terminating the relationship are canvassed. Statutory regulation through employment standards legislation, human rights codes, workers' compensation acts, occupational health and safety acts and other related statutes are covered.

Prerequisite: Law 51.203 or permission of the Department. Lectures and discussions three hours a week.

R.L. Campbell, M. Mac Neil

Note:

Students who have obtained credit for Law 51.320 (no longer offered) cannot also obtain credit for Law 51.341★.

Law 51.342★**Landlord and Tenant Relations**

An examination of the nature and history, creation and termination of the landlord and tenant relationship in Ontario, focusing on the rights and duties of both landlord and tenant under common law and statute and the legal distinction between residential and commercial tenancies. Particular attention is given to the recent statutory regulation of residential tenancies in Ontario, and the implications of rent control and security of tenure for housing policy.

Prerequisite: Law 51.203 or 51.220 or permission of the Department.

Lectures and discussion three hours a week.

Note:

Students who have obtained credit for Law 51.320 (no longer offered) cannot also obtain credit for Law 51.342★.

Law 51.345★**Labour Law**

A study of the ordering role of law in industrial relations. The course considers the effect of law on the relationship among employer, employer association, employee, union and the public. The main process considered is collective bargaining, and subprocesses studied are the recognition of the bargaining agent, bargaining for the collective agreement and administration of the agreement. The attempt to resolve industrial conflict by formalization of the disputes into adversary modes and other methods of conflict-resolution is considered. The ordering role is studied in both its social and legal context.

Prerequisite: Law 51.200 or 51.203 or 51.205 or permission of the Department. Permission may be given to students in Business or Directed Interdisciplinary Studies who have completed Law 51.231★.

Lectures and discussions three hours a week.

R.L. Campbell, M. Mac Neil

Note:

Students who have received credit for Law 51.441 (no longer offered) cannot also obtain credit for Law 51.345★.

Law 51.348★**Legal Aspects of Sport**

This course deals with issues in the legal regulation of sporting activities in Canada. Subjects considered include the constitutional power to regulate sport, government involvement in sports administration, criminal prosecutions for sports violence, civil liability for sports injuries including actions against school boards, sex discrimination in sport, and legal, economic and commercial aspects of profes-

sional and intercollegiate leagues including players' employment contracts and disciplinary proceedings.

Prerequisite: Law 51.203 or 51.205 or permission of the Department.

Lectures and discussions three hours a week.

Law 51.350★

Constitutional Law

An investigation of the Canadian constitution. Sovereignty, the nature and units of executive, legislative, and judicial power in Canada as interpreted by the courts. The distribution of powers under the Canadian constitution including an investigation of contemporary problems of federalism. Problems of judicial review.

Prerequisite: Law 51.205 or a Political Science course in Canadian government or permission of the Department.

Note:

Students who have received credit for Law 51.450 (no longer offered) may not also obtain credit for Law 51.350★.

Law 51.351★

Communications Law I

This course is concerned with the general laws governing the mass media in Canada, with attention to their effect on freedom of expression. Specific topics for examination include: the development of freedom of expression and of the press in Canadian constitutional law, including the effects of the Charter of Rights and Freedom; statutory limits on freedom of expression and of the press; contempt of court; civil defamation; and privacy. (Also listed as Journalism 28.351★ and Mass Communication 27.351★.)

Prerequisite: One of Law 51.100, Mass Communication 27.111, or Journalism 28.100, or permission of the Department.

Lectures and discussions three hours a week.

Law 51.352★

Communications Law II

The law as it affects the Canadian broadcasting and communications industry. The primary focus of the course is on the operations of the Canadian Radio-Television and Telecommunications Commission. Specific topics for examination may include: administrative formulation of policy; multiple, monopoly and foreign ownership; control of program content (violence, obscenity, "good taste," food and drug commercials, liquor advertising, indirect censorship); controlling program quality; the provision of a right of access to the media; cablevision licensing and control; alternative sanctions. (Also listed as Journalism 28.352★ and Mass Communication 27.352★.)

Prerequisite: One of Law 51.100, Mass Communication 27.111, or Journalism 28.100 or permission of the Department.

Lectures and discussions three hours a week.

Law 51.353

Civil Liberties and Human Rights

An examination of theoretical and empirical issues regarding civil liberties and human rights in the Canadian context. Issues that may be addressed include: competing theoretical approaches to rights and liberties; the historical development of rights; the desirability and effectiveness of employing rights discourses and rights strategies; the nature of the contests between individuals, collectivities and the state involved in rights claims. Empirical focus draws selectively from rights protected in the Canadian Charter of Rights and Freedoms as well as from human rights legislation, freedom of information statutes and the like, and may draw upon comparative study in order to enhance understanding of Canadian issues.

Prerequisite: Law 51.200 or 51.204 or 51.205 or permission of the Department.

Seminars three hours a week.

K.G. McShane and others

Law 51.354★

Law and Native Peoples of Canada

A study of the legal situation of native peoples in Canada. Topics include the constitutional framework of the law, Indian status, aboriginal rights, the treaty system, the relations between special native rights and the principle of equality before the law, hunting rights, government policy and the reserve system. Comparative references to native policy in other countries are also considered.

Prerequisite: One of Law 51.205, 51.353 or permission of the Department.

Law 51.355★

Law Reform and the Protection of Life

A study of the relationship among law, medicine and ethics concerning questions about life and death. Topics considered include the definition of death; cessation of treatment and euthanasia; right to refuse treatment; "right to die" legislation; meaning of "person" in the medical/legal context; informed consent; human experimentation; behaviour modification; and quality of life.

Prerequisite: Law 51.100 or 51.200 or 51.205 or permission of the Department.

Seminars three hours a week.

Law 51.363

Public International Law

An examination of the role of law in contemporary international relations. Nature, history and sources of international law; international personality of states; the status of international organizations and individuals; creation and effect of international obligations; importance and functions of law in the settlement of international disputes.

Precludes additional credit for Law 51.463, no longer offered.

Prerequisite: Law 51.100 or 51.200 or 51.205 or a Political Science or History course in international relations, or permission of the Department.

Seminars three hours a week.

Law 51.374★

Local Government Law

The legal framework of local and regional governments; the distribution of functions between the levels of local government and problems of the relationship between local government bodies and provincial and federal authorities; planning law and land use, regionalism and local government reform. (Also listed as Geography 45.374★.)

Prerequisite: Law 51.205 or permission of the Department. Evening division: Lectures and discussions three hours a week.

Note:

Students who have obtained credit for Law 51.374 (no longer offered) may not also obtain credit for Law 51.374★.

Law 51.380★

Law of Environmental Quality

An investigation of various aspects of law relating to environmental quality including resource conservation and pollution control. Examination of various control techniques and remedies.

Prerequisite: Law 51.203, 51.204 or 51.205 or permission of the Department.

Note:

Students who have received credit for Law 51.380 (no longer offered) may not also obtain credit for Law 51.380*.

Law 51.384

Law of the Family

This course examines the legal framework surrounding the family and family relationships in Canadian society. Main topics include marriage and cohabitation, matrimonial support, custody and access, adoption, child protection, domestic violence and dissolution of marriage. Major themes are state intervention in family affairs through the law; how the law copes with and encourages changes in the structure of the family; the relationship between movements towards equality for women and children and family law; the suitability of the adversarial process to family disputes.

Prerequisite: Law 51.203 or permission of the Department. Lectures and discussions three hours a week.

Note:

Students who have obtained credit for Law 51.284 (no longer offered) cannot also obtain credit for Law 51.384.

Law 51.395*

Practicum in Criminal Justice

This course provides experience in an institutional setting and supplements the theoretical approach of the classroom. An emphasis is placed on understanding the role of the particular agency within the wider institutional framework and also within a consistent and coherent policy on criminal justice. This course is graded on a satisfactory/unsatisfactory basis.

Prerequisite: Open only to students formally admitted to, and registered in, the Criminology and Criminal Justice Concentration.

Law 51.397*

Legal Research Methods

An introduction to basic methods used in the design and execution of research projects in law in a social science context. The course considers research principles, the significance of theoretical approaches taken to research, and the diversity of law-related materials and research procedures. Computer-assisted legal research, elementary problem-solving skills, bibliographic and citation skills are also developed. This is a required course for students enrolled in the Honours program.

Prerequisites: Any two of Law 51.203, 51.204, or 51.205 and Honours standing, or permission of the Department. Hours to be arranged.

Law 51.401*

Law, Family and Gender

The objective of the course is to explore the relationship between family law and: ideology of the family, gender roles, and the reproduction of family structures. The social ramifications of family law are emphasized, with a view to determining the potential for family law reform as an agency of social change.

Prerequisite: Law 51.301* or 51.384 and final-year Honours standing, or permission of the Department. Not offered 1990-91.

Law 51.402*

Feminist Theories of Law

This course identifies, describes and contextualizes the literature comprising feminist perspectives on law. The place of feminist theories on law within other critical literature on law is examined, as well as the differing theoretical bases of feminist perspectives on law (liberal, result

equality, socialist, radical, integrative and so on). The significance for theories of equality and for law reform strategies of understanding differences between feminist theories on law is stressed, as well as the unique contributions of the various perspectives.

Prerequisite: Law 51.301* or final-year Honours standing or permission of the Department.

Law 51.403*

Historical Perspectives on Law, Economy and Society

This course introduces students to the nature of the relationship between private law, and economic and social change. Theoretical perspectives of this relationship are illustrated with case studies of selected topics.

Prerequisite: Law 51.203 or permission of the Department. Not offered 1990-91.

Law 51.405*

Contemporary Theories of Law, State and Politics

An examination of contemporary approaches to law, state and politics with emphasis upon neo-marxist theories and 'post-marxist' challenges. The course explores questions of agency and structure in determining state and legal forms, responses and mediations and the roles of law and state in shaping political struggles.

Prerequisite: Law 51.204 or 51.205 or permission of the Department. Not offered 1990-91.

Law 51.406*

Church and State in the Laws of England, Scotland and Canada

This course examines, within a historical framework, the legal nature of the interaction of church and state in England, Scotland and Canada from the Reformation to the Canadian Charter of Rights and Freedoms. Particular emphasis is placed on the themes of religious pluralism within one state and resistance to state intervention in church affairs. Course content is interdisciplinary, with readings from legal, historical and theological literature.

Prerequisite: Law 51.100 or permission of the Department. M.H. Ogilvie

Law 51.410*

Modern Legal Theory

An introduction to realist and post-realist legal scholarship with a primary emphasis on Canadian, American and British approaches to the study of law. Topics to be addressed may include the Canadian Treatise tradition, American legal realism, empirical approaches to legal problems, the sociological movement in law, critical-legal scholarship, recent developments in marxian theories of law, normative economic theory, and Canadian feminist legal scholarship. Prerequisites: Any two of Law 51.203, 51.204, or 51.205; or permission of the Department.

Law 51.417*

Law in Advanced Capitalist Society

The course examines the different ways in which sociological and legal theory has attempted to grasp and understand the changing role and function of law in modern society, with particular reference to advanced capitalist societies. Topics include: the welfare state and the use of regulatory law; juridification and legalisation; counter-trends, deregulation, informalism, legal pluralism. (Also listed as Sociology 53.433*.)

Prerequisite: Law 51.311*, 51.315, 51.316* or 53.381* or permission of the Department.

Hours to be arranged.

A. Hunt

Law 51.420★**Advanced International Economic Law**

In-depth examination of selected topics in the field of international economic law. Topics to be studied may include the legal regulation of international economic activity, methods of dispute settlement in international economic and trade law, standardization of international trade laws, the development of an autonomous international trade law, and selected conventions and institutions governing international economic law.

Prerequisite: Permission of the Department.

Not offered 1990-91.

Law 51.422★**Control of the Management of Economic Units**

This course examines the role and function of persons involved in the management of economic units and the scope of legal regulation of them. Status, social responsibility, fiduciary obligations and rights are analyzed. Consideration of control and accountability of managers focus on obligations owed to the economic unit itself, the constitutional rights of members, and standards imposed by statutory regulation.

Prerequisite: Law 51.321★, or permission of the Department.

R.L. Campbell

Note:

Students who have obtained credit for Law 51.321 (no longer offered) may not also obtain credit for Law 51.422★.

Law 51.432★**Legal Regulation of Corporate Crime**

This course examines the current debates over the regulation of corporate crime from both legal and policy perspectives. Different theoretical perspectives on the nature and causes of corporate crime, and the role of the state in regulating corporate behaviour are examined with a view to determining the reasons for the failure of the criminal justice system to respond to corporate crime is examined through selected case studies.

Prerequisites: Law 51.204 and one of Law 51.305★, 51.321★ or 51.380★, or 51.321 (no longer offered) or permission of the Department.

Not offered 1990-91.

Law 51.435★**Criminal Justice Reform: Theory and Practice**

An advanced study of the problematic relationship between social transformation and criminal justice reform. This includes an examination of the theoretical and practical reasons behind the use of criminal law as an instrument of social control. Specific reform initiatives and processes are analyzed so as to illustrate not only the possible alternate responses to social problems but also the varying consequences of these responses.

Prerequisite: Law 51.204 or 51.234 and final-year Honours standing or permission of the Department.

Seminars three hours a week.

Law 51.436★**Contemporary Issues in Criminal Law**

An advanced seminar dealing with selected issues and problems in the area of criminal law not covered in the regular course program. The choice of topics varies from year to year depending on demand and interest. The topics are announced well in advance of the period of registration, and students are advised to consult with the Department.

Prerequisites: Law 51.204 and final-year Honours standing, or permission of the Department.

Law 51.437★**Legal Medical Issues in Criminal Law**

An advanced study of selected issues involving medical-legal conflicts and relationships in the field of social control. Topics covered may include mental disorder and criminal liability, theories of personality, diversion of offenders to civil commitment in hospital, insanity, automatism, fitness to stand trial, prediction of dangerousness, and the classification, control, prescription and prohibition of psychoactive drugs.

Prerequisites: Law 51.204 and final-year Honours standing or permission of the Department.

Law 51.438★**Sentencing: Theories and Practice**

This course examines theories of sentencing, current sentencing laws, sentencing practices and perceptions of sentencing. In addition, available data on sentencing practice across Canada are considered and recent reforms in other jurisdictions are studied. Finally there is critical review of the reforms recently proposed by the Canadian Sentencing Commission. The approach is multidisciplinary, drawing upon research and theory in the fields of law, criminology, social psychology and sociology.

Prerequisite: Law 51.204 or permission of the Department.

This course may not be taken by students who have completed the course as a special topics course.

Hours to be arranged.

R. Mohr

Law 51.440★**The Arbitration Process in Industrial Relations**

An examination of arbitration in industrial relations in the form of rights arbitration to resolve disputes in the administration of the collective agreement and in the form of interest arbitration to resolve disputes in the negotiation of the collective agreement. The benefits and drawbacks of the process, the values that it espouses and the results that it produces are considered.

Prerequisite: Law 51.345★ or permission of the Department.

Seminars three hours a week.

Note:

Students who have obtained credit for Law 51.441 (no longer offered) may not also obtain credit for Law 51.440★.

Law 51.445★**Labour Relations in the Public Service**

A study of the collective bargaining process in the public sector with particular emphasis on the federal, Ontario and Quebec public services. The problems of adapting accepted collective bargaining procedures and techniques to the public service environment; the right to strike in the public service and essential industries; grievance procedures; the general problem of labour-management relationships in the public sector and the consequences thereof for efficiency and loyalty.

Prerequisite: Law 51.341★ or 51.345★ or 51.441 or permission of the Department.

Seminars three hours a week.

Law 51.451★**Selected Problems in Comparative Constitutional Law**

The topics of this course may vary from year to year. Topics may include comparative federalism, comparative study of civil liberties and human rights, comparative bases and theories of judicial review in their social, political, economic or historical contexts.

Prerequisite: Law 51.350★ or permission of the Department.

Note:

Students who have received credit for Law 51.450 (no longer offered) may not also obtain credit for Law 51.451★.

Law 51.456★

Administrative Law I

Administrative law and practice. Defining and implementing public policy, creating and structuring the administrative body, and interpreting the enabling statute. Comparisons between administrative bodies and courts of law. Procedure before administrative bodies. Comparisons between individual federal and provincial administrative bodies.

Prerequisite: Law 51.200 or 51.205, and final-year Honours standing, or permission of the Department.

Fall term: Lectures and discussions three hours a week.

Note:

Students who have obtained credit for Law 51.455 (no longer offered) may not also obtain credit for Law 51.456★.

Law 51.457★

Administrative Law II

Characteristics and problems of control of administrative action. Varieties of legal control, judicial review, discretion, privative provisions and damages, appellate control and statutory reform. (Also listed as Public Administration 50.537★.)

Prerequisite: Law 51.456★, Public Administration 50.536★ or permission of the Department.

Lectures and discussions three hours a week.

Note:

Students who have obtained credit for Law 51.455 (no longer offered) may not also obtain credit for Law 51.457★.

Law 51.460★

The Law of International Organizations

The nature, character, as well as the legal status and jurisdiction of intergovernmental international organizations. Sovereign equality of states and their rights and duties arising from membership in international organizations. The distinction between international and supra-national institutions. Particular attention is focused on the United Nations system, including the International Court of Justice; selected subsidiary organs, and specialized agencies; the role of the non-governmental organizations at times of crisis.

Prerequisite: Law 51.363 (formerly 51.463) or permission of the Department.

Hours to be arranged.

Law 51.464★

Legal Aspects of the International Protection of Human Rights

This course is an introduction to the developing international law relating to the protection of human rights. General concepts, rules and institutions are considered, together with specific issues of concern, for example, self-determination, aboriginal rights, the refugee problem, and torture. The inherent problems and overall potential of international law in this area are discussed.

Prerequisite: Law 51.353 or Law 51.363 (formerly 51.463) or permission of the Department.

Lectures and discussions three hours a week.

Law 51.465★

Contemporary Issues in Public International Law

The topics of this course, to be offered as demand warrants, may vary from year to year and are announced well in advance of the relevant registration period. They may include (a) transnational environmental issues; (b) the in-

ternational law of armed conflict, peacekeeping and neutrality; (c) the law of international treaties and transnational agreements; and (d) state responsibility under international law.

Prerequisite: Law 51.363 (or, if Law 51.465★ is offered in the Winter term, concurrent registration in Law 51.363) or permission of the Department.

Seminars three hours a week.

Law 51.467★

Immigration and Refugee Law

Immigrants and refugees are considered in a Canadian legal and demographic context, and in the context of international and human rights law. The course analyzes the criteria and the procedures established by the Canadian Immigration Act in the light of developments in immigration policy. It examines legal and social problems faced by non-citizens and rights-related issues affecting refugees and immigrants, including entry and removal, family reunion, citizenship, remedies, the rights of clandestine migrants; settlement rights; non-discrimination; asylum; and a national community's right to determine membership.

Prerequisite: Law 51.205 or permission of the Department.

Seminar three hours a week.

Law 51.486★

The Civilist Tradition

A comparative study of selected topics of several major European legal systems which are based on Roman law. The development of Roman law up to and including Justinian's *corpus juris civilis*. The reception of Roman law by various European continental legal systems. Comparative analysis of selected articles of the French, Austrian and German codes.

Prerequisites: Law 51.100 (or its equivalent) and another Law course or a Classics course or permission of the Department.

Lectures and discussions three hours a week.

D. Wayand

Law 51.487★

Quebec Civil Law

A comparative examination of the legal system of Quebec. The weight and importance of the various sources of law in Quebec and how the law is made. Study of the Quebec Civil Code and of the force of the code provisions. Division of the code and influence of Roman law. Techniques of interpretation of the code. Detailed study of selected Articles of the code. Interpretation and application of the code in federal appeal courts.

Prerequisites: Law 51.100 (or its equivalent) and another Law course or Law 51.486★ or permission of the Department.

Lectures and discussions three hours a week.

Law 51.488★

Socialist Legal Systems

A comparative approach to selected legal problems of the Soviet Union and a number of other socialist states. Marxist concepts of state and law, the Leninist, Stalinist and contemporary interpretations of law and their practical applications.

Prerequisite: One of Law 51.100 (or its equivalent), 51.200, 51.205, 51.450, 51.486★, a course in East European government or in the history of Eastern Europe or permission of the Department.

Not offered 1990-91.

Law 51.490

Directed Studies

A reading or research course for selected students who

wish to investigate a particular topic of interest. Available to Third- and Fourth-year students only.

Prerequisite: Written acceptance by a faculty adviser or permission of the Department.

Law 51.491★

Tutorial in Law

Members of the Department are prepared to give reading courses in selected fields. Students are encouraged to enquire from individual instructors or the Supervisor of Honours in what fields such reading courses are available.

Prerequisite: Written acceptance by a faculty member and permission of the Department.

Fall term.

Law 51.492★

Tutorial in Law

Members of the Department are prepared to give reading courses in selected fields. Students are encouraged to enquire from individual instructors or the Supervisor of Honours in what fields such reading courses are available.

Prerequisite: Written acceptance by a faculty member and permission of the Department.

Winter term.

Law 51.493★

Advanced Legal Topics

The topics of this course, to be offered as demand warrants, vary from year to year, and are announced well in advance of the period of registration. (Students are advised to consult with the Department.)

Law 51.494★

Advanced Legal Topics

The topics of this course, to be offered as demand warrants, vary from year to year, and are announced well in advance of the period of registration. (Students are advised to check with the Department)

Law 51.498

Honours Essay

Students in the Honours program must write an Honours Essay or a designated equivalent. Students in the Combined Honours program are required to write an Honours Essay in Law or a designated equivalent.

Prerequisites: Law Honours students will normally have 14 credits towards their Honours B.A. in Law before they register in Law 51.498; they must have obtained a minimum of C+ in Law 51.200 (old program) or an average of at least C+ in their required 200-level courses (new program) and received written acceptance by a faculty supervisor.

Law 51.498 (first registration) includes a mandatory weekly workshop during Fall term of first registration.

Graduate Courses Open to Undergraduate Students

Law

51.510F1 Advanced Problems in Legal Philosophy

51.520F1 International Economic Law: Regulation of Trade and Investment

51.563W2 International Law: Theory and Practice

Courses Planned for Summer School and Evening Division 1990-91

As of publication of this Calendar, the Department hopes to be able to offer the following courses during the Summer sessions and Evening divisions for the next two years. Changes may be made, however, and interested persons are urged to consult the Department and to refer to future issues of the Calendar as they are published.

Summer 1990

51.100, 51.203, 51.204, 51.205; others to be announced.

Evening Division 1990-91

51.100, 51.203, 51.204, 51.205, 51.341★, 51.345★, 51.353, 51.355★, 51.374★, 51.380★, 51.384, 51.445★, 51.464★, 51.494★.

Summer 1991

51.100, 51.203, 51.204, 51.205; others to be announced.

Management Committee

Program Co-ordinator
R.P. Saunders

Office
S. Rochon
Telephone: 788-2588

Members
M. Marshall (*Dean, Faculty of Social Sciences*)
P. Fitzgerald (*Law*)
J.G. Bellamy (*History*)
T. Wilkinson (*Director, Continuing Education*)
One student

Students are permitted eight attempts to complete the six-credit program.

General Information

This certificate program is designed for persons employed in the areas of law enforcement, national security or corrections, who wish to attend university courses. The program is offered in Day and Evening divisions. Candidates for the certificate are also encouraged to investigate undergraduate degree programs offered by the University. Courses taken for the certificate are normally creditable towards a Bachelor of Arts degree. Such a degree program will normally require at least nine further credits in addition to those required for the certificate. Persons who wish to complete a Bachelor of Arts degree after taking the certificate must complete at least five of the credits required for a Bachelor of Arts degree after the awarding of the certificate.

Admission Requirements

The basic admission requirement is the completion of the Ontario Secondary School Diploma including six Ontario Academic Courses, or the Ontario Secondary School Honour Graduation Diploma, or the equivalent, with a minimum overall average of 60 percent. Special consideration will be extended to other applicants under Mature Applicant regulations (see Mature and Special Admissions, p. 28).

Candidates may be admitted with advanced standing, but must complete at least four credits for the certificate, including all core courses, at Carleton University.

Course Requirements

The following courses are required:

1. Law 51.204 (Introduction to Criminal Law in Context, prerequisite is C- or better in Law 51.100, or permission of the Department of Law);
2. Sociology 53.255★ and 53.256★ (Sociology of Deviance, and Police in Society);
3. Political Science 47.200 (Canadian Government and Politics);

The candidate must, in addition, complete three credits, chosen in consultation with the Program Co-ordinator.

A candidate for the certificate must obtain a grade of C or better in at least one-half of the credits taken at Carleton University for the certificate.

Paterson Hall, Room 249
Telephone: 788-2802

Officers of Instruction

Chairman
Aviva Freedman

Professors
William Cowan
Hans-George Ruprecht
Janice Yalden

Associate Professors
Aviva Freedman
C. Stanley Jones
Ian Pringle
Jaromira Rakušan
Helmut Zobl

Assistant Professors
Ellen Cray
Ann Laubstein

General Information

The Department of Linguistics offers programs leading to a Major degree in Linguistics and Honours degrees with two specializations – Theoretical Linguistics and Applied Linguistics. The aim of the Major program is to provide the student with the general linguistic background and methodological bases and procedures for the analysis of language and languages, on both the descriptive and historical levels. In addition to the introductory course (Linguistics 29.100), there is a core of half-credit courses dealing with the special areas within linguistics, such as historical linguistics, semantics, psycholinguistics, sociolinguistics, language typology, language pedagogy and speech science.

The completion of the Major program enables the student to choose either of the two Honours degree specializations.

The Honours program in Theoretical Linguistics further deepens the student's knowledge of phonetics, phonology, grammar and general linguistic theory. The Honours program in Applied Linguistics is designed for students intending to specialize in teaching English as a foreign language and other matters related to foreign language study in general.

The Department of Linguistics also offers a five-credit program leading to a Certificate in the Teaching of English as a Second Language for those students who already have a degree, in either Linguistics or another subject, or who have extensive experience in teaching. The courses include the theory of teaching English as a second language, an intensive, advanced course in the structure of English, and a range of complementary half-credit courses.

English as a Second Language

For courses in English as a Second Language, see p. 67.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Pass Programs

Students in the Pass program in Linguistics must complete the following courses:

Linguistics 29.100, 29.301★, 29.302★, 29.303★, 29.304★, 29.381★, plus three other credits in Linguistics. In addition, all students must have a working knowledge of a modern language other than English, proficiency to be determined by successful completion of a university course in the language or by an oral or written test given by the Department.

For Pass programs combining Linguistics with another subject, students must complete:

Linguistics 29.100, 29.301★, 29.302★, 29.303★, 29.304★, plus one further credit in Linguistics.

Honours Programs

(a) For the Honours degree in Theoretical Linguistics, students must complete:

Linguistics 29.100, 29.301★, 29.302★, 29.303★, 29.304★, 29.381★, 29.401★, 29.402★, plus five other credits in Linguistics (including at least one and a half at the 400 level).

In addition to the above stated requirements, all students must have a working knowledge of a modern language other than English, proficiency to be determined by successful completion of a university course in the language or by an oral or written test given by the Department.

(b) For the Honours degree in Applied Linguistics, students must complete:

Linguistics 29.100, 29.301★, 29.302★, 29.303★, 29.304★, 29.381★, 29.421★, 29.423★, 29.425, 29.426★, 29.462★, 29.485, plus two other credits in Linguistics.

Students who are not native speakers of English must have their English proficiency assessed in the Centre for Applied Language Studies on admission to Carleton and, depending on the results, may be required to take some or all of ESL 21.130, 21.150, 21.190 and 21.196★ as part of their degree.

In addition to the above stated requirements, all students must have a working knowledge of a modern language other than English, proficiency to be determined by successful completion of a university course in the language or by an oral or written test given by the Department.

(c) For a Combined Honours degree in Linguistics, students must complete:

Linguistics 29.100, 29.301★, 29.302★, 29.303★, 29.304★, 29.381★, and two and a half further credits in Linguistics (including at least one and a half at the 400 level).

In addition to the above stated requirements, all students must have a working knowledge of a modern language other than English, proficiency to be determined by suc-

successful completion of a university course in the language or by an oral or written test given by the Department.

(d) For a Combined Honours degree in Linguistics and Russian (Translation Option), students must complete:

Linguistics 29.100, 29.301★, 29.303★, 29.304★, 29.485, 29.490, and the courses outlined in the requirements of the Russian Department. In this program, the Tutorial in Linguistics consists obligatorily of directed readings in the theory of translation. See also p. 233.

Mention: français

Students in the Pass or Honours program in Linguistics may qualify for the notation "Mention: français" (p. 41) by fulfilling the requirements outlined below. Those wishing to pursue this path should consult with the Department's "Mention: français" adviser.

Linguistic courses presented in fulfilment of the "Mention: français" requirements can double as courses to satisfy Linguistics Pass or Honours requirements.

Students enrolling in courses at the University of Ottawa will do so through the University of Ottawa Exchange Program. To enrol in courses in French at another university, students must obtain a Letter of Permission (see articles 3.10 and 3.12, pp. 58-59).

Pass or Combined Pass Programs (3 credits)

To graduate with the notation "Mention: français" students must include in their program the following:

1. One credit in French language chosen in consultation with the Department of French, for perfecting the students' command in French.
2. One credit linked to the study of the heritage and culture of French Canada taught in French at Carleton or the University of Ottawa.

At Carleton: French 20.332;

At the University of Ottawa: FRA 3799, LIN 2502, LIN 2505, LIN 3502, LIN 3503.

3. One credit in the area of linguistics taught in French at Carleton, at the University of Ottawa or at another university. At Carleton, one credit chosen from French 20.312, 20.333★, 20.334★, 20.432★, 20.433★, 20.434★, 20.435, Linguistics 29.397.

4. Combined Pass program students must meet the "Mention: français" requirements of both disciplines.

Honours and Combined Honours (4 credits)

To graduate with the notation "Mention: français" students must include in their program the following:

1. One credit in French language chosen in consultation with the Department of French, for perfecting the students' command in French.
2. One credit linked to the study of the heritage and culture of French Canada taught in French at Carleton or the University of Ottawa.

At Carleton: French 20.332;

At the University of Ottawa: FRA 3799, LIN 2502, LIN 2505, LIN 3502, LIN 3503.

3. One credit in the area of linguistics taught in French at Carleton, at the University of Ottawa or at another university. At Carleton, one credit chosen from French 20.312, 20.333★, 20.334★, 20.432★, 20.433★, 20.434★, 20.435, 29.397.

4. One credit at the 400-level in the area of linguistics taught in French at Carleton, at the University of Ottawa or

at another university. At Carleton, one credit chosen from French 20.432★, 20.433★, 20.434★, 20.435★ (if not taken during the Third year), Linguistics 29.497.

The focus of the tutorials (Linguistics 29.397 and 29.497) may be on any of the following topics: American Indian languages, sociolinguistique, bilinguisme, dialectologie, développement de la langue maternelle pendant les années scolaires, problèmes du bilinguisme scolaire, pragmatique, grammaire du texte, sémiotique, sémantique. All written work must be submitted in French.

5. Combined Honours students must meet the "Mention: français" requirements of both Honours disciplines.

Certificate in the Teaching of English as a Second Language (CTESL)

To receive the Certificate in the Teaching of English as a Second Language, students must meet the following requirements:

Linguistics 29.100, 29.421★, 29.423★, 29.425, 29.426★, 29.462★, 29.485. (Part-time students who had already been admitted and had completed some courses towards the Certificate before 1983-84 may, after discussion with the departmental adviser, elect to complete the Certificate either in accordance with the foregoing requirements or in accordance with the earlier requirements, viz. Linguistics 29.100, 29.420, 29.421★, 29.422★, 29.423★, 29.462★ and 29.485.) A candidate for the Certificate must obtain a grade of C or better in all courses taken at Carleton University under the Certificate program. In addition, students in the CTESL program must be fluent in English, proficiency to be determined by an oral or written test given by the Department.

It should be noted that students cannot receive both a B.A. degree and a Certificate at the same time, nor can courses included in a B.A. or other degree be credited towards the certificate. If any of the foregoing Linguistics courses are included in the B.A., then the student must choose other courses in Linguistics in consultation with the Department.

Admission Requirements

Applicants are admitted on the recommendation of the Department of Linguistics. Applicants have normally completed a first degree in another discipline, or a course of study in a teacher training college. Others with a strong academic background or with experience in the teaching of English as a second language may be admitted with permission of the Department. It should be noted that the number of student spaces in the program is limited. Thus, it may not be possible to grant admission to all applicants who meet the foregoing requirements. Admissions will, therefore, be on a selective basis with preference given to those candidates who show the highest promise of success in the program.

Courses Offered

Linguistics 29.100

Introduction to Linguistics

Elementary principles and methods of descriptive analysis of language; phonetics; phonology; morphology; syntax. Survey of other areas of linguistics: historical linguistics, sociolinguistics, psycholinguistics, semantics, applied linguistics.

Linguistics 29.211★**Historical Linguistics**

Principles and methods of the historical analysis of languages; the comparative method; internal reconstruction; sound change; rule change; the philological method; problems in historical analysis.

Prerequisite: Linguistics 29.100.

Lectures and discussion three hours a week.

Linguistics 29.223★**Linguistic Theory and Second-Language Learning**

A critical study of linguistic theory and description applied to second-language learning. Includes a brief consideration of similarities and differences in first- and second-language development, bilingualism and types of linguistic error and their significance.

Prerequisite: Linguistics 29.100.

Lectures and discussion three hours a week.

Linguistics 29.232★**Semantics**

The study of meaning as a part of the study of communication. Organization of the semantic structure of language, and the relation of this structure to the lexicon.

Prerequisite: Linguistics 29.100.

Lectures and discussion three hours a week.

Linguistics 29.261★**Psycholinguistics**

Language performance and language use; the production and perception of language; psychological processes involved in speech performance; the relevance of these questions to linguistic theory.

Prerequisite: Linguistics 29.100.

Lectures and discussion three hours a week.

Linguistics 29.264★**Speech and Language Problems**

An examination of the congenital, developmental and acquired disorders of language, speech and voice; prevalences, types, causes and effects; related research.

Prerequisite: Linguistics 29.261★.

Lectures and discussion three hours a week.

Linguistics 29.271★**Sociolinguistics**

The place of language within society; bilingual and multilingual communities; language, social mobility and social stratification; sociolinguistic factors in language change.

Prerequisite: Linguistics 29.100.

Lectures and discussion three hours a week.

Linguistics 29.272★**Language Typology**

The study of language typology as a classificatory device, universalist hypothesis, and areal features. Methodology in language typology. The theoretical material is based on a survey of the world's languages and language types.

Prerequisite: Linguistics 29.100.

Lectures and discussion three hours a week.

Linguistics 29.280**Language and Communication**

Among theories about the nature of language that the course examines are those of Skinner and the behaviourists; of Chomsky and other transformational-generative grammarians; and of the speech-act theorists. Among questions to which an answer is attempted are: What is language? What is meaning? What is it to communicate? Philosophical issues with respect to such topics as the following are considered: language and innate

knowledge; language and culture; translation; the origins and acquisition of language; nonverbal communication; nonhuman language; machine languages; ideal languages, normative grammar and "correct" speech. (Also listed as Philosophy 32.280 and Mass Communication 27.280.)

Prerequisite: Second-year standing.

Lectures and discussion three hours a week.

Linguistics 29.295**Introduction to the English Language**

A course intended particularly as an in-service course for teachers of English and the language arts. The sound system of English in relation to English spelling; English vocabulary, grammar and syntax; stages in the acquisition of English as a first language, especially after age six; roles and uses of English in Canada; standard English; pedagogical implications.

This course is chiefly intended for practising or future teachers. It usually meets on an irregular schedule off-campus. Classes may begin before the first week in September. Prospective students should contact the Department to verify their admissibility well in advance of the beginning of the course. (Also listed as English 18.295.)

Prerequisite: Admission to the Certificate in English Language and Composition program or permission of the Department.

Linguistics 29.297**Writing: Theory and Practice**

A study of the process of writing in theory and practice. Readings and discussions focus on the nature of the composing process; the development of writing abilities from the elementary years to maturity; the interrelationships between thinking and writing; strategies for encouraging growth in writing.

This course is chiefly intended for practising or future teachers. It usually meets on an irregular schedule off-campus. Classes may begin before the first week in September. Prospective students should contact the Department to verify their admissibility well in advance of the beginning of the course. (Also listed as English 18.297.)

Prerequisite: Second-year standing or enrolment in the Certificate Program in English Language and Composition.

Linguistics 29.301★**Phonetics**

Recognition, description, transcription and production of speech sounds; systems of transcription; the nature of the speech-producing mechanism; the acoustics of speech sounds. (Also listed as Anthropology 54.301★.)

Prerequisite: Linguistics 29.100.

Lectures and discussion three hours a week.

Linguistics 29.302★**Phonology**

The sound-systems of languages; methods for the analysis and description of phonological structure. The course concentrates on generative theory with comparisons to other theories. (Also listed as Anthropology 54.302★.)

Prerequisite: Linguistics 29.301★.

Lectures and discussion three hours a week.

Linguistics 29.303★**Language Analysis**

Direction and practice in the analysis of grammatical material, including both morphology and syntax. Models for the description of grammatical regularities. Course work consists principally of practical exercises. (Also listed as Anthropology 54.303★.)

Prerequisite: Linguistics 29.100.

Lectures and discussion three hours a week.

Linguistics 29.304★

Grammatical Theory

Comparison of major current schools of linguistics. Theories of grammatical structure. The testing of grammatical hypotheses. Grammatical structure and meaning. Course work consists principally of lectures and readings. (Also listed as Anthropology 54.304★.)

Prerequisite: Linguistics 29.303★.

Lectures and discussion three hours a week.

Linguistics 29.381★

Language Structure

Intensive analysis of the linguistic structure of a selected language, the structure of which is not currently being offered elsewhere in the University. This course may be taken for credit twice, provided a different language is being studied. Language for 1989-90 to be announced.

Prerequisite: Linguistics 29.100.

Lectures and discussion three hours a week.

Linguistics 29.390

Independent Study

Research under the supervision of a member of the Department. Projects may be organized on an individual basis, or as a special seminar directed by an instructor. No more than one group project is normally offered in any one year. Normally open only to Third- and Fourth-year students.

Prerequisite: Permission of the Department.

Linguistics 29.391★

Independent Study

Research under the supervision of a member of the Department. Projects may be organized on an individual basis, or as a special seminar directed by an instructor. No more than one group project is normally offered in any term. Normally available only to Third- and Fourth-year students in Linguistics.

Prerequisite: Permission of the Department.

Fall term.

Linguistics 29.392★

Independent Study

Research under the supervision of a member of the Department. Projects may be organized on an individual basis, or as a special seminar directed by an instructor. No more than one group project is normally offered in any term. Normally available only to Third- and Fourth-year students in Linguistics.

Prerequisite: Permission of the Department.

Winter term.

Linguistics 29.397

Etudes dirigées

Un programme de lectures ou de recherche et de travaux écrits dirigé par un membre du département. Les projets de recherche peuvent être organisés soit comme *tutorial* pour un(e) seul(e) étudiant(e) soit comme séminaire pour un groupe d'étudiants. Il n'y a pas plus d'un séminaire par année.

For Third- or Fourth-year Linguistics students of Mention: français only.

Prerequisite: Permission of the Department.

Linguistics 29.401★

Advanced Phonology

A continuation of Linguistics 29.302★. Among topics covered: the methodological problems of phonology, the problems of markedness and natural rules, ordering,

abstractness, and other current theoretical developments.

Prerequisite: Linguistics 29.301★, 29.302★, 29.303★, 29.304★ or permission of the Department.

Lectures and discussion three hours a week.

Linguistics 29.402★

Advanced Grammar

A continuation of Linguistics 29.304★. Among topics covered: global rules, clause movement, constraints, trace theory and other current developments in syntactic analysis.

Prerequisite: Linguistics 29.301★, 29.302★, 29.303★, 29.304★ or permission of the Department.

Lectures and discussion three hours a week.

Linguistics 29.409★

Seminar in Current Issues in Linguistics

The investigation of a theoretical issue that is currently the subject of controversy in linguistics, the topic being selected each year by the students and faculty.

Prerequisite: Linguistics 29.301★, 29.302★, 29.303★, 29.304★ or permission of the Department.

Lectures and discussion three hours a week.

Linguistics 29.421★

Language Testing

The principles of test construction as applied to testing language proficiency, achievement and aptitude. Structural, notional, discrete point and integrative tests are covered. Students are expected to create, analyse and evaluate language tests.

Prerequisite: Linguistics 29.223★ or enrolment in the CTESL program.

Lectures and discussion three hours a week.

Linguistics 29.423★

Analysis of Discourse

Principles of discourse analysis and their application in problems in applied linguistics, such as the effect of classroom discourse on second-language learning, and methods for expanding the variety of discourse in a classroom setting. Students are required to observe both actual classroom interaction and videotapes of classroom discourse, and to undertake detailed analysis of such discourse.

Prerequisite: Third- or Fourth-year standing in Linguistics or enrolment in the CTESL program.

Lectures and discussion three hours a week.

Linguistics 29.425

Teaching English as a Second Language: Methodology

Classification of classroom teaching materials and adaptation of teaching materials for particular situations; creation of teaching materials; teaching techniques and strategies. Prerequisite or corequisite: Linguistics 29.223★ or enrolment in the CTESL program.

Lectures and discussion three hours a week.

Linguistics 29.426★

Practicum in Teaching English as a Second Language: Experience in an ESL teaching situation

Students have the opportunity to integrate the more academic dimension of the program with practical work. Students may tutor individual ESL students, help with the preparation of teaching materials or teach classes. The grades are assigned on a Satisfactory/Unsatisfactory basis. The course extends over both Fall and Winter terms, normally taken concurrently with Linguistics 29.425.

Linguistics 29.461★

Seminar in Experimental Linguistics

Experimental phonetics; the investigation of linguistic performance; the testing of propositions derived from the theory of linguistic competence.

Prerequisite: Linguistics 29.301★, 29.302★, 29.303★, 29.304★ or permission of the Department.

Lectures and discussion three hours a week.

Linguistics 29.462★

Second-Language Acquisition

Current models of second-language acquisition and learning with an emphasis on empirical studies. Universals of second-language acquisition.

Prerequisite: Linguistics 29.261★ or enrolment in the CTESL program.

Lectures and discussion three hours a week.

Linguistics 29.485

Structures of English

An intensive introduction to the structures of the English language, with particular emphasis on syntax; questions of usage and style; an introduction to regional, social and stylistic variation in English and to Canadian English.

Prerequisite: Linguistics 29.100 and Third- or Fourth-year standing, or full-time enrolment in the CTESL program.

Lectures and discussion three hours a week.

Linguistics 29.490

Tutorial in Linguistics

A course designed to permit students to pursue their interests in a selected area of linguistics. Students prepare papers as a basis for discussion with the tutor. The topic of study must have the prior approval of the tutor and the Department. The course is available only to Fourth-year Honours students, and may be taken only once.

Prerequisite: Permission of the Department.

Linguistics 29.491★

Tutorial in Linguistics

A course designed to permit students to pursue their interests in a selected area of linguistics. Students prepare papers as a basis for discussion with the tutor. The topic of study must have the prior approval of the tutor and the Department. The course is available only to Fourth-year Honours students, and may be taken only once.

Prerequisite: Permission of the Department.

Fall term.

Linguistics 29.492★

Tutorial in Linguistics

A course designed to permit students to pursue their interests in a selected area of linguistics. The student prepares papers as a basis for discussion with the tutor. The topic of study must have the prior approval of the tutor and the Department. The course is available only to Fourth-year Honours students, and may be taken only once.

Prerequisite: Permission of the Department.

Winter term.

Linguistics 29.495

Research Seminar in English and Education

Investigation of recent developments in language study, rhetoric and composition, and studies of the literary imagination. Their implications for the teaching of English. (Also listed as English 18.495.)

This course is chiefly intended for practising or future teachers. It usually meets on an irregular schedule off-campus. Classes may begin before the first week in September. Prospective students should contact the Department to verify their admissibility well in advance of the beginning of

the course.

Prerequisite: Linguistics 29.485 or English 18.295 and Linguistics 29.297 or permission of the Department.

Linguistics 49.497

Etudes dirigées

Etudes spécialisées en linguistique. Préparation d'un travail écrit ou d'une mémoire sur un sujet choisi par l'étudiant(e) en collaboration avec le directeur du *tutoriel* et approuvé par le département.

For Fourth-year Linguistics students of "Mention: français" only.

Prerequisite: Permission of the Department.

St. Patrick's Building, Room 310
Telephone: 788-7408

Associate Director, School of Journalism
Eileen Saunders

Bachelor of Arts in Mass Communication

The School of Journalism (see p. 162) offers Pass and Honours undergraduate programs in Mass Communication. Candidates for the Pass program are required to take a minimum of 15 credits after Senior Matriculation and those in the Honours program 20 credits after Senior Matriculation. The Mass Communication programs are provided for students with broad interests in mass communication in contemporary society who do not intend to pursue careers as professional journalists. The Honours degree is designed for students who intend to do graduate work in communication or a related field.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all regulations and requirements of the School of Journalism as set out below.

Admission and Continuation Requirements

Admission and continuation requirements in the two programs are those set by the Faculty of Arts. However, admission to the Second year of a Mass Communication program will be guaranteed only to First-year students with a minimum B- in Mass Communication 27.111 and a 7.0 overall grade-point average (calculated on five credits, including failures).

Pass Program

The requirements for a Pass program in Mass Communication include six credits in Mass Communication:

1. Mass Communication 27.111, 27.201, 27.211, 27.311;
2. Two credits chosen from Mass Communication 27.280, 27.290, 27.305★, 27.306★, 27.342★, 27.343★, 27.346★, 27.351★, 27.352★, 27.355★, 27.357★;
3. Either Sociology-Anthropology 56.220 or Political Science 47.200;
4. Eight electives.

Note:

The prerequisites for Sociology-Anthropology 56.220 and Political Science 47.200 are normally waived for students in a Mass Communication program.

Combined Pass Program

The requirements for a Combined Pass program including Mass Communication are requirement 1 and one credit from requirement 2 of the Pass program.

Honours Program

A candidate for a B.A. with Honours in Mass Communication requires nine credits in Mass Communication and one

specified credit from another discipline. The requirements are:

1. Mass Communication 27.111, 27.201, 27.211, 27.311;
2. Two credits chosen from Mass Communication 27.280, 27.290, 27.305★, 27.306★, 27.342★, 27.343★, 27.346★, 27.351★, 27.352★, 27.355★, 27.357★;
3. Three credits chosen from Mass Communication 27.401, 27.410★, 27.412★, 27.430★, 27.432★, 27.450★, 27.451★, 27.497;
4. Either Sociology-Anthropology 56.220 or Political Science 47.200;
5. Ten elective credits.

Recommended sequence for B.A. Honours in Mass Communication

First Year

Mass Communication 27.111;
Four electives.

Second Year

Mass Communication 27.201, 27.211;
Sociology-Anthropology 56.220 or Political Science 47.200;
Two electives.

Third Year

Mass Communication 27.311;
Two credits chosen from Mass Communication 27.280, 27.290, 27.305★, 27.306★, 27.342★, 27.343★, 27.346★, 27.351★, 27.352★, 27.355★, 27.357★;
Two electives.

Fourth Year

Three credits chosen from Mass Communication 27.401, 27.410★, 27.412★, 27.430★, 27.432★, 27.450★, 27.451★, 27.497;
Two electives.

Combined Honours

Students taking Combined Honours in Mass Communication and another discipline are required to take the following credits:

1. Mass Communication 27.111, 27.201, 27.211, 27.311;
2. One other 200- or 300-level Mass Communication credit;
3. Two of Mass Communication 27.401, 27.410★, 27.412★, 27.430★, 27.432★, 27.450★, 27.451★, 27.497.

Combined Honours in Journalism and Mass Communication

Course requirements are:

1. Journalism 28.100, 28.220, 28.320, 28.351★, 28.352★, 28.421 and, if the Honours degree sought is the Bachelor of Journalism, Journalism 28.498;

Note: Journalism 28.320 is a two-credit course.

2. Mass Communication 27.201, 27.211, 27.311, and two credits chosen from Mass Communication 27.401, 27.410★, 27.412★, 27.430★, 27.432★, 27.450★, 27.451★, 27.497;

3. A French language credit (acceptable French language credits are any two of French 20.102★, 20.103★, and 20.104★; 20.108; and 20.110.)

4. An approved credit in Canadian history. (Students who expect to practise journalism in another country may be advised to choose a different history course and must seek permission to do so from the Supervisor of Undergraduate Studies, Journalism.);

5. Approved options to make up a program total of 20.5 credits.

Courses Offered

Mass Communication 27.111

Introduction to Mass Communication

An examination of some of the major reasons for the emergence in the 20th century of Mass Communication as a field of study, with discussion of main research trends: the historical development of newspapers, magazines, radio, television, and other mass media; modern mass media structures and their relationship to social and cultural changes; and basic issues related to communication and cultural policy.

Lectures and discussion groups three hours a week.

Mass Communication 27.201

Media Research

An introduction to empirical research methods of media enquiry. The objects of the course are the development of an understanding of statistical analysis and research design and proficiency in computer analysis of research data.

Prerequisites: Mass Communication 27.111 or Journalism 28.100 and Major or Honours standing in Mass Communication or permission of the Mass Communication program.

Lecture two hours a week, laboratory one hour a week.

Mass Communication 27.211

The Mass Media In Modern Society

An examination of the historical development and current operations of the major mass media, with a view to relating developments to the larger social structure. Emphasis is on the relationship between the media and the structure of Canadian society. (Also listed as Sociology-Anthropology 56.211.)

Prerequisites: Mass Communication 27.111 and Major or Honours standing in Mass Communication or permission of the Mass Communication program.

Lectures and discussion three hours a week.

Mass Communication 27.280

Language and Communication

Among theories about the nature of language that the course examines are those of Skinner and the behaviourists; of Chomsky and other transformational-generative grammarians; and of the speech-act theorists. Among questions to which an answer is attempted are: What is language? What is meaning? What is it to communicate? Philosophical issues with respect to such topics as the following are considered: language and innate knowledge; language and culture; translation; the origins and acquisition of language; nonverbal communication; nonhuman language; machine languages; ideal languages; normative grammar and "correct" speech. (Also listed as Philosophy 32.280 and Linguistics 29.280.)

Prerequisite: Second-year standing.

Lectures and discussion three hours a week.

Mass Communication 27.290

Truth and Propaganda

A study of techniques, some ancient as well as modern, for influencing public opinion. The ethics of various attempts to control, affect or modify mass consciousness, under circumstances of wartime or peace, by the state, political parties, commercial interests or pressure groups, are discussed. Attention is paid to definition of key terms such as "propaganda," "manipulation," and the like, in the light of shifting nuances of different times and usages. The problem of arriving at a satisfactory definition of "truth" to compare or contrast with "propaganda" is one focal point of investigation. The values of an open society, as against those promoted by closed societies, also receive attention, account being taken of subtler as well as more obvious forms of censorship, and of external as well as internal attempts to influence or subvert public consciousness in a given society. (Also listed as Philosophy 32.290.)

Mass Communication 27.305★

International Media Systems

This course is concerned with the flow of world news — how it is collected, transmitted, received, selected, edited and distributed; how it informs or inhibits our views of the world around us. It examines the relationship and dependence of Canadian media on regional and international institutions and systems. It examines such items as media systems; the role of international news agencies; the role of global telecommunication systems; the foreign news-gathering operations of national radio and television networks, and the inter-network arrangements for news distribution; the role of supranational media institutions such as UNESCO, the International Press Institute, the Inter-American Press Association and the International Organization of Journalists; the role of regional distribution agencies such as Intervision, Eurovision, European Broadcasting Union, Asian Broadcasting Union. (Also listed as Journalism 28.305★.)

Prerequisite: One of Journalism 28.100, 28.200, Mass Communication 27.111, 27.211 or permission of the Mass Communication program.

Mass Communication 27.306★

Comparative Media Studies

This course is concerned with comparisons of media content, organization or operation. Comparisons may be cross-cultural in nature (i.e. comparisons of English and French-Canadian media content), cross-media (i.e. comparisons of broadcast and print media organizations), cross-national (i.e. comparisons of media operations in various countries) or a mixture of these. There may also be comparisons over time. Some time is spent examining and employing research tools and methods used in these studies. (Also listed as Journalism 28.306★.)

Prerequisites: One of Journalism 28.100, 28.200, Mass Communication 27.111, 27.211 or permission of the Mass Communication program.

Mass Communication 27.311

Advanced Study of the Mass Media

An examination of the philosophical and theoretical foundations of mass communication studies. The course is an analysis of the content of selected theories with a view to assessing the contributions they make to the understanding of mass communication. (Also listed as Sociology-Anthropology 56.311.)

Prerequisites: Mass Communication 27.211 and Major or Honours standing in Mass Communication or permission of the Mass Communication program.

Lecture and discussion groups three hours a week.

Mass Communication 27.342★

On Television

This course examines the television medium as it was formed historically, both as a social institution and as a technological form. Various methods by which television texts might be analysed are presented, and different genres are compared and discussed.

Prerequisite: Mass Communication 27.211 or permission of the Mass Communication program.

Lectures and discussion three hours a week.

Mass Communication 27.343★

Communication Technology and Culture

An examination of the relationship between communication technology and society. The course examines the factors that contribute to changes in the collection, storage and distribution of information and their cultural implications.

Prerequisites: Mass Communication 27.211 or permission of the Mass Communication program.

Seminar three hours a week.

Mass Communication 27.346★

Media Construction and Social Issues

A study of the industrial-bureaucratic structures of the news media and their relevance to the reporting of social and political issues; an examination of the dominant discourses on these issues and their relevance for the organization of newswork. The social issues to be discussed this year are peace/disarmament/security. The issues may vary from year to year.

Prerequisite: Mass Communication 27.211 or permission of the Mass Communication program.

Lectures and discussion three hours a week.

Mass Communication 27.351★

Communications Law I

This course is concerned with the general laws governing the mass media in Canada, with attention to their effect on freedom of expression. Specific topics for examination include: the development of freedom of expression and of the press in Canadian constitutional law, including the effects of the Charter of Rights and Freedoms; statutory limits on freedom of expression and of the press; contempt of court; civil defamation; and privacy. (Also listed as Journalism 28.351★ and Law 51.351★.)

Prerequisite: Mass Communication 27.111, Journalism 28.100, or Law 51.100, or permission of the Mass Communication program.

Day division, Fall term: Lectures and discussions three hours a week.

Mass Communication 27.352★

Communications Law II

The law as it affects the Canadian broadcasting and communications industry. The primary focus of the course is on the operations of the Canadian Radio-Television and Telecommunications Commission. Specific topics for examination may include: administrative formulation of policy; multiple, monopoly and foreign ownership; control of program content (violence, obscenity, "good taste," food and drug commercials, liquor advertising, indirect censorship); controlling program quality; the provision of a right of access to the media; cablevision licensing and control; alternative sanctions. (Also listed as Journalism 28.352★ and Law 51.352★.)

Prerequisite: Mass Communication 27.111, Journalism 28.100, or Law 51.100, or permission of the Mass Communication program.

Evening division, Winter term: Lectures and discussion three hours a week.

Mass Communication 27.355★

Media and Gender

An examination of the role of mass media in shaping our conceptions of gender roles, and an evaluation of the social, political and cultural consequences of such conceptions. Topics to be considered include: male and female images in media content; the relative status of men and women within media professions; organizational and institutional factors in the treatment of gender; regulatory policies and possibilities concerning the gender issue within media institutions.

Prerequisite: Mass Communication 27.211 or permission of the Mass Communication program.

Lectures and discussion three hours a week.

Mass Communication 27.357★

Special Topic

An examination of a special topic in mass communication not covered in depth in other courses. The topic varies from year to year. Possible topics include: communications policy analysis; the political economy of the mass media; and the social impact of new communications technology. Topic for 1990-91: To be announced.

Prerequisite: Mass Communication 27.211 or permission of the Mass Communication program.

Mass Communication 27.401

Advanced Media Research

An advanced study of specific methodological issues and statistical techniques appropriate to the investigation of theoretical questions concerning mass communication and society. The course is primarily concerned with the selection of appropriate methodologies and models for investigating specific questions and for this reason the content of the seminar changes somewhat from year to year. Among the topics that may be considered are content analysis, multivariate analysis, scale construction techniques, path analysis and experimental and survey design.

Prerequisites: Mass Communication 27.201, 27.311 and Honours standing in Mass Communication or permission of the Mass Communication program.

Mass Communication 27.410★

Selected Topics in Mass Communication Analysis

Selected topics in mass communication, not ordinarily treated in the regular course program. The choice of topics varies from year to year.

Prerequisite: Mass Communication 27.311 and Honours standing in Mass Communication or permission of the Mass Communication program.

Seminar three hours a week.

Mass Communication 27.412★

Selected Topics in Mass Communication Analysis

Selected topics in mass communication, not ordinarily treated in the regular course program. The choice of topics varies from year to year. Topic for 1990-91: *The New World Information and Communication Order*. The basic theme of the course is the growing gap between the development of global communication systems and the ability of world organizations to manage the economic, political and socio-cultural consequences. This is a seminar course in which students conduct research on such topics as the evolution of the debate about the NWICO, how the media have covered this debate, and the relationship of the NWICO to recent changes in international communications.

Prerequisite: Mass Communication 27.311 and Honours

standing in Mass Communication or permission of the Mass Communication Program.

Seminar three hours a week.

Mass Communication 27.430★

Communication Policy: Theory and Foundations

This course examines theoretical perspectives on the role and context of communication and cultural policy in modern Canadian society. It introduces students to basic concepts necessary to explain the role of the State in capitalist society. It explores alternative frameworks for understanding the production and legitimation of communication and cultural policy as a type of State action. (Also listed as Sociology-Anthropology 56.430★.)

Precludes additional credit for Mass Communication 27.431 and Sociology-Anthropology 56.431, no longer offered, and Mass Communication 27.411 or Sociology-Anthropology 56.411 taken prior to 1986-87.

Prerequisite: Mass Communication 27.311 or Sociology-Anthropology 56.311 and Honours standing in Mass Communication or permission of the Mass Communication Program.

Seminar three hours a week.

Mass Communication 27.432★

Communication Policy: Institutions and Practices

This course examines concrete examples of selected policy practices in the communication and cultural policy field and relates them to the institutions, agencies, actors and social interests shaping the policy formation process in Canada. (Also listed as Sociology-Anthropology 56.432★.)

Precludes additional credit for Mass Communication 27.431 and Sociology-Anthropology 56.431, no longer offered, and Mass Communication 27.411 or Sociology-Anthropology 56.411 taken prior to 1986-87.

Prerequisite: Mass Communication 27.430★ or Sociology-Anthropology 56.430★ and Honours standing in Mass Communication or permission of the Mass Communication Program.

Seminar three hours a week.

Mass Communication 27.450★

Mass Media and Capitalist Democracy I

An examination of the relationship between the rise and expansion of the mass media and the political, economic and cultural development of Europe and North America from the early nineteenth century to the Second World War. Consideration is given to the interaction between the mass media and processes such as democratization, industrialization, urbanization, imperialism, mass consumption, and the growth of corporate capitalism.

Prerequisite: Mass Communication 27.311 and Honours standing in Mass Communication or permission of the Mass Communication program.

Mass Communication 27.451★

Mass Media and Capitalist Democracy II

A continuation of Mass Communication 27.450★, focusing on the period from the Second World War to the present day.

Prerequisite: 27.450★ or permission of the Mass Communication program.

Mass Communication 27.497

Honours Essay

The Honours Essay, which is a major research essay, is carried out under the direction of a faculty supervisor. The Honours Essay is evaluated by both the supervisor and an appointed reader.

Prerequisite: Final-year Honours standing in Mass Communication.*

*Students should refer to general Faculty of Arts regulations regarding submission of Honours Essays, (p. 61).

Dunton Tower, Room 710
Telephone: 788-2155
Undergraduate Adviser: 788-2150

Bachelor of Arts Programs

The Department of Mathematics and Statistics (Faculty of Science) offers a wide variety of programs leading to Bachelor of Arts Pass and Honours degrees, as well as Bachelor of Science degrees. The following is a list and short description of the Arts programs that are available:

Mathematics (Pass and Honours B.A.)

The B.A. Pass programs emphasize methods and applications, whereas the B.A. Honours programs emphasize theoretical aspects and serve as an introduction to graduate studies. The main areas of concentration are algebra, analysis, topology, applied mathematics (classical and modern), statistics and probability. Of particular interest may be the Combined Honours programs such as:

Economics and Mathematics (Honours B.A.) Mathematics and Philosophy (Honours B.A.)

For these two Combined Honours programs, the minimum requirements have been specified (see p. 389).

It is in fact possible to combine studies in Mathematics with almost any other department in the Faculties of Arts or Social Sciences at both the Major and Honours levels, subject to the approval of the course selections by the respective departments.

Computer Mathematics (Pass and Honours B.A.)

The Major and Honours B.A. programs in Computer Mathematics are designed to provide a student with a background of computer-related mathematical ideas together with a firm base of computer science. These programs may be of interest to students who are preparing for careers in government, industry, management, or systems analysis.

Statistics (Pass and Honours B.A.)

The Pass B.A. program in statistics provides the academic groundwork for employment opportunities at the junior methodologist level, in a variety of statistics-related fields.

The Honours B.A. program is designed primarily for a student who wishes to prepare for a career as a professional statistician.

Operations Research (Honours B.A.)

This program is devoted to the professional discipline which deals with the scientific aspects of planning and decision-making and leads to an Honours B.A. Degree. (See also pp. 197, 401.)

Students wishing more details on these or other programs offered through the Faculty of Science should consult pp. 401-402. For further information, contact the Departmental Undergraduate Adviser.

Loeb Building, Room 911A
788-3733

Officers of Instruction

Chairman

Bryan Gillingham

Professors

Bryan Gillingham
Alan Gillmor
John Shepherd

Associate Professors

Patrick Cardy
Elaine Keillor
David Piper

Adjunct Professors

Helmut Kallmann (*National Library of Canada*)
Peter Wicke (*Direktor, Forschungszentrum populäre Musik, Humboldt Universität*)

Sessional Lecturers

Michael Bussière
Lisette Canton
Yaya Diallo
Jennifer Giles
Lora Matthews
Graham Pilkington
Ann Schau
Don Wallace

Director, Performance Studies

Verna Jacobson

Director, Carleton Choir

Lisette Canton

Director, Carleton Concert Band

Peter Manley

Director, Carleton Contemporary Music Group

To be announced

Director, Carleton Jazz Ensembles

Bill Jupp

Director, Early Music Consorts

Iain Phillips

Recorder Classes

Barbara Gaizauskas – advanced
Carla Hos – beginners

Instrumental and Vocal Instructors

Cello

Rosalind Sartori
Pawel Szymczyk-Marjonovic

Clarinet

Peter Smith

Double Bass

Edward Hounsell

Early Instruments

Iain Phillips

Flute

Jean-Guy Brault
Susan Morse
Cathy Rollins

French Horn

Nat Battersby

Guitar

Rod Elias (*Jazz*)
David Johnstone
Stephen Rollins
Ray Sealey
Stephen Watson (*Bass*)

Harp

Manon LeComte

Harpsichord

Karen Holmes

Oboe

Veronica Milroy

Organ

Mark Toews
Wesley Warren

Percussion

Ken Simpson

Piano

Verna Jacobson
Dina Namer
Robin Pitre (*Jazz*)
Ann Schau
Sandra Webster

Recorder

Barbara Gaizauskas

Saxophone

Michael Scoria (*Jazz*)
Kirk MacDonald
Peter Smith

Trombone

Drummond Hudson

Trumpet

Tom Moyer
Douglas Sturdevant

Tuba

Nicholas Atkinson

Violin/Viola

Joan Milkson

Voice

Susanna Burton
Donna Klimoska
Joan Maxwell
Gloria Jean Nagy

General Information

The purpose of the programs offered by the Department of Music is to promote an intellectual, aesthetic and emotional understanding of music as an expression of human cultural activity. All students will be encouraged to examine the meanings and motivations of the art and to develop their speculative and critical responses to it in both historical and contemporary contexts. Stated briefly, the Department wishes to offer flexibility of choice and emphasis in programs that foster a basic grasp of the nature of musical processes from historical, social, practical and artistic points of view.

In addition to its undergraduate programs, the Department offers courses at the graduate level in the history of Canadian music in co-operation with the Institute of Canadian Studies.

The Department also sponsors a variety of non-credit performing groups including the *Carleton Choir*, *Early Music Consorts*, *Carleton Concert Band*, *Carleton Jazz Ensembles*, and *The Contemporary Music Group*, all of which are open to Carleton students and members of the community. B.Mus. and B.A. (Option A) students are required to belong to at least one such group in each year of residency. Students are also expected to attend weekly noon-hour concerts and occasional guest lectures. Copies of the departmental handbook will be available in the office in September of each academic year; students are expected to consult it for further information.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Pass Program (B.A.)

Each prospective student *must* consult the Department of Music for advice before entering the program.

The three-year B.A. program in Music requires 15.0 credits, including a minimum of 7.0 credits in Music as follows:

Option A

1. Music 30.100, 30.150★ and 30.151★, normally to be taken in First year;
2. Music 30.190★;
3. 3.0 credits from Music 30.210★ through 30.265★;
4. 1.5 credits in Music at the 300 level or above.

Note:

Music 30.295★ and 30.490★ may not be taken under this option.

Option B

1. Music 30.100, normally to be taken in First year;
2. 3.0 credits from Music 30.210★ through 30.231★;
3. Music 30.321★ and 30.322★;
4. 1.0 credit in Music at the 300 level or above;

5. 1.0 additional credit in Music.

Note:

Performance courses may not be taken under this option.

Combined Pass Program (B.A.)

Each prospective student *must* consult the department of each discipline for advice before entering the Combined Pass program.

The three-year B.A. program in Music combined with another subject requires 15.0 credits, including a minimum of 4.0 credits in Music as follows:

1. Music 30.100, normally to be taken in First year;
2. 2.0 credits from Music 30.210★ through 30.260;
3. 1.0 credit in Music at the 300 level or above.

Note:

Performance courses may not be taken in this program.

Honours in Music Program (B.Mus.)

Each prospective student should have an appreciable background in practical music-making and *must* consult the Department of Music for advice before entering the program.

The four-year B.Mus. program requires 20.0 credits, including a minimum of 11.0 credits in Music as follows:

1. Music 30.100, 30.150★, 30.151★ and 30.190★, normally to be taken in First year;
2. Music 30.250★, 30.251★ and 30.290★ normally to be taken in Second year;
3. 4.0 credits from Music 30.210★ through 30.265★ (excluding 30.250★ and 30.251★), normally to be completed by the end of Third year;
4. 1.0 credit from Music 30.321★, 30.322★, 30.350★, 30.355★, 30.356★, 30.357★, 30.360;
5. Music 30.390★, normally to be taken in Third year;
6. Music 30.490★ or 30.497, normally to be taken in Fourth year;
7. 1.0 credit from Music 30.496 (Honours Portfolio in Composition), 30.497 (Graduating Recital) or 30.498 (Honours Essay in Musicology);
8. Those who elect to take Music 30.497 are precluded from taking 30.490★, and are thus required to complete an additional 0.5 credit in Music;

B.Mus. students are also required to take:

1. 1.0 credit, or equivalent thereof, in a language other than English. Students contemplating graduate study are strongly advised to develop further their language skills;
2. At least 3.0 credits (including 1. above) in a discipline or disciplines other than Music.

Students transferring into the B.Mus. program must have achieved a grade-point average of 6.0 in the required Music credits and a Continuation Index of 6.0. Students beginning the final 5.0 credits towards the B.Mus. degree must have achieved a grade-point average of 6.5 in the required Music credits and a Continuation Index of 6.0. To be eligible to graduate, B.Mus. students must have achieved a grade-

point average of 6.5 in the required Music credits and a Continuation Index of 6.0.

Honours in Music Program (B.A. Hons.)

Each prospective student *must* consult the Department of Music for advice before entering the program.

The four-year B.A. Honours program requires 20.0 credits, including a minimum of 11.0 credits in Music as follows:

1. Music 30.100, normally to be taken in First year;
2. 4.0 credits from Music 30.210★ through 30.231★;
3. Music 30.321★ and 30.322★;
4. 2.0 credits in Music at the 300 level or above;
5. Music 30.498;
6. 2.0 additional credits in Music.

Note:

Performance courses may not be taken in this program.

B.A. Honours students are also required to take:

1. 1.0 credit, or equivalent thereof, in a language other than English. Students contemplating graduate study are strongly advised to develop further their language skills;
2. At least 3.0 credits (including 1 above) in a discipline or disciplines other than Music.

Students transferring into the B.A. Honours program must have achieved a grade-point average of 6.0 in the required Music credits and a Continuation Index of 6.0. Students beginning the final 5.0 credits towards the B.A. Honours degree must have achieved a grade-point average of 6.5 in the required Music credits and a Continuation Index of 6.0. To be eligible to graduate B.A. Honours students must have achieved a grade-point average of 6.5 in the required Music credits and a Continuation Index of 6.0.

Combined Honours Program (B.A. Hons.)

Each prospective student *must* consult the department of each discipline for advice before entering the Combined Honours program.

The four-year B.A. Honours program in Music combined with another subject requires 20.0 credits, including a minimum of 6.0 credits in Music as follows:

1. Music 30.100, normally to be taken in First year;
2. 2.0 credits from Music 30.210★ through 30.260;
3. 2.0 credits in Music at the 300 level or above;
4. 1.0 credit in Music at the 400 level.

Note:

Performance courses may not be taken in this program.

Students transferring into the B.A. Combined Honours program must have achieved a grade-point average of 6.0 in the required Music credits. Students beginning the final 5.0 credits towards the B.A. Combined Honours degree must have achieved a GPA of 6.5 in the required Music credits and a Continuation Index of 6.0. To be eligible to

graduate B.A. Combined Honours students must have achieved a grade-point average of 6.5 in the required Music credits and a Continuation Index of 6.0.

Diploma in Music (Dip.M.)

This program is designed to attract individuals who have a strong background in performance on a musical instrument or voice, and who are desirous of obtaining additional academic qualifications. The program requires 5.0 credits in Music, as listed below, plus a graduating recital of approximately 30 minutes duration.

Applicants will be admitted on the basis of an audition to be held in the spring of each year. Although normal admission requirements are the Ontario Secondary School Diploma including six Ontario Academic Courses, or equivalent (see p. 25) and an adequate level of performance, special consideration will be extended to other applicants under mature applicant regulations.

Courses taken for the Diploma are normally creditable towards a B.A., B.Mus. or B.A. Honours degree. Transfer students from the Diploma program into a degree program will be required to take at least 10.0 (or in the case of B.Mus. or B.A. Honours, 15.0) further credits in addition to those required by the Diploma program.

Students already holding a degree in Music must take for the Diploma program 5.0 credits other than those already completed. Permission of the Department is required for the choice of these 5.0 credits.

The Diploma in Music program requires 5.0 credits in Music as follows:

1. 1.0 credit in Music theory (normally Music 30.150★ and 30.151★);
2. 2.0 credits in Music history (normally 30.100 and 1.0 credit from 30.210★ through 30.231★);
3. Music 30.495. A recital of approximately 30 minutes duration will determine a portion of the grade for Music 30.495. A high level of performance is expected and a minimum grade of C+ is required.
4. 1.0 additional credit in Music.

To be eligible to graduate, a student in the Diploma in Music program must have achieved a grade-point average of 6.0 in the required Music credits.

Courses Offered

The majority of courses are open to non-Majors; students are advised to consult the Department.

Music 30.100

Introduction to Music

A general survey of world musics from an aesthetic, historical and social perspective, including Western high culture music from the medieval period to the present, folk and tribal musics, music in Asian high cultures, and popular musics. There is a strong emphasis on the listening experience.

Evening division: Lectures three hours a week.

Music 30.115

Elementary Materials of Music

An introduction to the rudiments of music for those who,

although interested in the theory of music, have had no opportunity to study it systematically: a study of elementary harmony and the basics of melodic writing through written work, aural training and music dictation, with emphasis on the development of analytic listening skills. This course is not accepted, even as an option, toward the requirements of the B.Mus. or B.A. (Option A) degrees. However, it is an acceptable option for the B.A. (Honours) or B.A. (Option B) degrees.

Day division: Lectures three hours a week.

Music 30.150★

Theoretical Studies I

An introduction to functional tonality: a study of the harmonic, melodic, rhythmic and formal structures of the common practice period, with emphasis on the development of written musical skills.

Prerequisite: Permission of the Department.

Evening division, both terms: Lectures two hours a week throughout the year.

Music 30.151★

Aural Training I

A practical study of music as an aural phenomenon through singing and non-Western percussion techniques. Hearing skills and aural concentration are developed through recall, reproduction, aural analysis and transcription. Sound materials are drawn from a wide range of sources, live and recorded.

Precludes additional credit for Music 30.150 taken prior to 1987-88.

Prerequisite: Permission of the Department.

Day and Evening divisions, both terms: Laboratory four hours a week throughout the year.

Music 30.152★

Keyboard Harmony I

A practical study of rhythm, melody and harmony at the keyboard (or on guitar), with emphasis on melody harmonization (in a variety of styles), improvisation, score reading and figured bass realization.

Precludes additional credit for Music 30.150 taken prior to 1987-88.

Prerequisite: Permission of the Department.

Day division, both terms: Workshop one and one half hours a week through the year.

Music 30.190★

Performance I

Vocal or instrumental instruction for Music Pass program (Option A) and B.Mus. students only. A reasonable standard of ability is required on entry, and every prospective student is required to consult the Performance Director (a brief audition may be required) to ensure appropriate placement with a teacher. A brief prepared recital before a jury of faculty members is required at the end of the year. Individual tuition, one half hour a week.

Music 30.195★

Secondary Performance I

Instruction for Music Pass program (Option A) and B.Mus. students only, in a second instrument of their choice. Tuition is normally offered on a group basis. Areas of concentration from which students may choose are: keyboard, woodwinds, brass, strings, voice, historical instruments, and percussion.

Group tuition up to one hour a week.

Music 30.210★

Music In the Middle Ages

A survey of European music from the beginning of the

Christian era to the end of the fourteenth century, including the study of secular monophony, liturgical music and medieval polyphony.

Prerequisite: Second-year standing.

Evening division, Fall term: Lectures three hours a week.

B. Gillingham

Music 30.211★

Music in the Renaissance

The development of vocal and instrumental music from 1400 to 1600, including examination of the important works by the Masters of the Burgundian and Flemish schools, of Roman and Protestant church music, of the Italian madrigal, the French chanson and Elizabethan music.

Prerequisite: Second-year standing.

Evening division, Winter term: Lectures three hours a week.

B. Gillingham

Music 30.212★

Music in the Baroque Era

A survey of European music and its environment from approximately 1600 to the deaths of Bach and Handel. Topics include: secular vocal music; solo and concerted instrumental music; music for the Catholic and Protestant churches; the music and significance of major personalities from Monteverdi and Schütz to Bach and Handel.

Prerequisite: Second-year standing.

Not offered 1990-91.

Music 30.213★

Music in the Classical Era

A study of European music from the early eighteenth century to the beginning of Romanticism. The evolution of the Classical style is traced in the important works of composers from the 1720s to the Viennese school of Haydn, Mozart and Beethoven.

Prerequisite: Second-year standing.

Not offered 1990-91.

Music 30.214★

Music in the Romantic Era

A survey of nineteenth-century European music. Important genres (opera, art-song, symphony and symphonic poem) as well as individual and national styles are examined in the context of the socio-political climate of the period.

Prerequisite: Second-year standing.

Day division, Fall term: Lectures three hours a week.

A. Gillmor

Music 30.215★

Twentieth-Century Music to World War II

Music from 1900 to circa 1945, including an examination of modern idioms from Debussy to impressionism to Viennese expressionism, nationalism and Stravinskian neoclassicism.

Prerequisite: Second-year standing.

Day division, Winter term: Lectures three hours a week.

Music 30.216★

Music Since World War II

A study of selected aspects of the musical avant-garde in the Western classical tradition since circa 1945, including post-Webern serialism, colouristic and textural composition, music of political commitment, electronic music, musical theatre, process music and the music of chance.

Prerequisite: Second-year standing.

Day division, Fall term: Lectures three hours a week.

D. Piper

Music 30.223★**The Blues**

An examination of the Blues from their roots in pre-twentieth century black music to the advent of soul. Principal topics to be surveyed include Delta Blues, Texas Blues, City and Classic Blues of the 1920s, the growth of blues bands in the 1930s, the impact of electronic instruments, Chicago Blues of the late 1930s and 1940s, Texas urban Blues, and the emergence of Rhythm and Blues.

Prerequisite: Second-year standing.

Evening division, Fall term: Lectures three hours a week.

Music 30.225★**Ragtime and Jazz**

A survey of ragtime and jazz from the roots in pre-twentieth-century black music to contemporary jazz idioms, including an examination of New Orleans jazz and Dixieland, swing, bebop, cool jazz, free jazz, and jazz/rock fusion.

Prerequisite: Second-year standing.

Not offered 1990-91.

Music 30.226★**Commercial Music 1890-1955**

A survey of commercial popular music from the inception of the music industry in the U.S.A. and the U.K. in the late 1890s to the advent of rock 'n' roll in 1954. Topics to be examined include: the rise of North-American vaudeville, the changing nature of the sentimental ballad, the adoption for commercial ends of various Afro-American styles such as ragtime, blues, 1920's jazz and 1930's swing, the emergence of dance as mass entertainment, Broadway, Hollywood, the impact of copyright laws and the influence of musicians' unions.

Prerequisite: Second-year standing.

Day division, Winter term: Lectures three hours a week.

Music 30.227★**Rock Music**

A survey of the history of Rock music from its beginnings in Country music and black Rhythm and Blues until the present. Sub-genres included in the study are early Rock 'n' Roll, British Rhythm and Blues, Heavy Metal, Punk, New Wave and Progressive Rock.

Prerequisite: Second-year standing.

Evening division, Fall term: Lectures three hours a week.

A. Gillmor

Music 30.228★**Country, and Country and Western**

A survey of the history of American country music from its beginnings as a legacy of the folk music of the British Isles and Ireland, through its early development as a force in commercial music, to its present status as a popular music of middle America.

Prerequisite: Second-year standing.

Day division, Winter term: Lectures three hours a week.

Music 30.229★**Soul**

A survey of the history of Soul from its beginnings as a fusion of Rhythm and Blues and Gospel in the late 1950s, through its early commercial manifestations (Motown) to the development of different sub-genres of black American popular music in the 1970s and 1980s.

Prerequisite: Second-year standing.

Not offered 1990-91.

Music 30.230★**An Introduction to Ethnomusicology**

The basic techniques in ethnomusicology are introduced and illustrated through a survey of the folk and tribal musics

of Europe, Asia, Africa, Australia and Oceania, North and South America.

Precludes additional credit for Music 30.315 taken prior to 1986-87.

Prerequisite: Second-year standing.

Not offered 1990-91.

Music 30.231★**Music of the Asian High Cultures**

A comparative and analytical study of music in Asian high cultures, including India, China, Korea, Indonesia, Japan, and the Arabic world, through an examination of the music, musical instruments and theoretical systems.

Prerequisite: Second-year standing.

Not offered 1990-91.

Music 30.250★**Theoretical Studies II**

A continuation of Music 30.150★.

Precludes additional credit for Music 30.250 taken prior to 1987-88.

Prerequisite: Music 30.150★ or permission of the Department.

Evening division, both terms: Lectures three hours a week throughout the year.

Music 30.251★**Aural Training II**

A continuation of Music 30.151★.

Precludes additional credit for Music 30.250 taken prior to 1987-88.

Prerequisites: Music 30.150★ and 30.151★.

Evening division, both terms: Laboratory four hours a week throughout the year.

Music 30.252★**Keyboard Harmony II**

A continuation of Music 30.152★ with emphasis on practical study at the keyboard (or on guitar) and on advanced score reading and modulation.

Prerequisite: Music 30.152★.

Day division, both terms: Workshop one and one-half hours a week through the year.

Music 30.260**Composition I**

An introductory course designed to enable students to develop abilities in the writing of original music. The study and application of modern and contemporary styles and techniques are emphasized.

Prerequisite: Music 30.150★ or permission of the Department.

Day division: Lectures and seminars three hours a week.

D. Piper

Music 30.265★**Choral Conducting**

A course designed to introduce students to the special stylistic features of choral music from the Renaissance to the present as well as to a variety of practical techniques (vocal production, gesture, conducting patterns, diction, etc.). The course contains a research component in choral literature as well as practical experience in conducting techniques.

Not offered 1990-91.

Music 30.290★

Performance II

A continuation of Music 30.190★ for Music Majors (Option A) and B.Mus. students only. A brief prepared recital before a jury of faculty members is required at the end of the year. Prerequisite: Music 30.190★ or permission of the Department.

Individual tuition, one half hour a week.

Music 30.295★

Secondary Performance II

A continuation of Music 30.195★ for B.Mus. students only. Prerequisite: Music 30.195★.

Group tuition up to one hour a week.

Music 30.310

Music in Canada

A survey of musics in Canada from the earliest historical records to the present day. Topics include: the sacred and secular music of New France; the cultivated and vernacular traditions after 1760; Mathieu and Willan; new trends circa 1940; electro-acoustic music; Schafer and the contemporary soundscape; and popular music in Canada. Not offered 1990-91.

Music 30.312★

Music in the United States in the Twentieth Century

A survey of contemporary American music. Topics include: lives and the experimental tradition, Copland, Thomson, Harris and the American nationalists; the neoclassicists and neoromantics; Gershwin and the third stream; and post-1945 developments in indeterminacy and minimalism. Prerequisites additional credit for Music 30.312 taken before 1986-87.

Day division, Winter term: Lectures three hours a week. A. Gillmor

Music 30.321★

Music and Culture I: Contexts

An examination of the major forces affecting the production and consumption of music. Principal topics to be addressed include the role of the music industry, the effect of technologies on music, music in the Third World, music in Socialist countries, and the production and consumption of music in historical contexts.

Prerequisites additional credit for Music 30.320 taken prior to 1988-89.

Prerequisite: Permission of the Department.

Day division, Fall term: Lectures three hours a week.

Music 30.322★

Music and Culture II: Text

An examination of methods of elucidating the meaning and significance of different musical styles and systems in their social and cultural contexts. Principal topics to be addressed include culturalist, semiological, structuralist, ethnomusicological and feminist approaches to the technical analyses of different musical traditions.

Prerequisites additional credit for Music 30.320 taken prior to 1988-89.

Prerequisite: Permission of the Department.

Day division, Winter term: Lectures three hours a week.

Music 30.340★

A History of Opera before 1800

A survey of the development of opera from the beginnings to about 1800. The course deals with the major monuments of Italian, French, German and English opera, by such composers as Monteverdi, Cavalli, Scarlatti, Purcell, Lully,

Gluck, Rameau, Mozart and Haydn.

Not offered 1990-91.

Music 30.341★

A History of Opera from 1800 to the Present

A study of the modern operatic tradition from approximately 1800 to the present day, including such topics as German romantic opera, French grand opera, Italian lyricism and verismo, Russian realism and German expressionism, Britten and the English school.

Day division, Fall term: Lectures three hours a week.

A. Gillmor

Music 30.342★

A History of the Madrigal

A study of the development of the madrigal and its social milieu from its earliest stages to the middle of the seventeenth century through a detailed examination of selected works from the Italian and English schools.

Prerequisite: Music 30.211★.

Day division, Fall term: Lectures three hours a week.

B. Gillingham

Music 30.350★

Theoretical Studies III

A study of the structures and styles of music after the common practice period, with emphasis on the development of written musical skills.

Prerequisites additional credit for Music 30.350 taken prior to 1987-88.

Prerequisite: Music 20.250★ or permission of the Department.

Not offered 1990-91.

Music 30.353★

Contrapuntal Techniques I

A study of the polyphonic techniques of vocal and instrumental music of the Renaissance, with emphasis on the development of written skills.

Prerequisite: Music 30.250★ or permission of the Department.

Not offered 1990-91.

Music 30.354★

Contrapuntal Techniques II

A study of post-Renaissance contrapuntal techniques, with emphasis on the development of written skills.

Prerequisite: Music 30.250★ or permission of the Department.

Day division, Winter term: Lectures three hours a week.

D. Piper

Music 30.355★

Analyses I

A study of the style and structure of selected works from the Middle Ages to the seventeenth century.

Prerequisites additional credit for Music 30.355 taken prior to 1987-88.

Prerequisite: Music 30.150★ and 30.151★ or permission of the Department.

Not offered 1990-91.

Music 30.356★

Analyses II

A study of the style and structure of selected works from the seventeenth to the twentieth centuries.

Prerequisites additional credit for Music 30.355 taken prior to 1987-88.

Prerequisite: Music 30.250★ and 30.251★ or permission of the Department.

Day division, Fall term: Lectures three hours a week.

Music 30.357★**Analysis III**

A study of the processes, textures and structures of selected examples of popular and non-Western musics.

Prerequisite: Music 30.251★.

Not offered 1990-91.

Music 30.360**Composition II**

In part a continuation of Music 30.260, but more emphasis is placed on developing the student's own creative personality.

Prerequisites: Music 30.250★, 30.260 and either 30.215★ or 30.216★; or permission of the Department.

Day division: Small-group tutorial two hours a week.

D. Piper

Music 30.361**Orchestration**

A study of the instruments of the orchestra, their historical background, ranges and technical abilities, with emphasis on the development of practical written skills in orchestrating works for a variety of small and large ensembles.

Prerequisite: Music 30.250★ or permission of the Department.

Not offered 1990-91.

Music 30.363★**Computer Music Techniques**

An introduction to the techniques of sound synthesis primarily through practical experience at the digital synthesizer and computer. This course includes the basics of machine operations, software and computer applications to composition and synthesis. Enrolment in this course is limited.

Prerequisite: Permission of the Department.

Day division, Fall term: Lectures three hours a week, plus individual studio time.

Music 30.364★**Computer Music Projects**

A continuation of Music 30.363★. The various applications of digital equipment are examined through the realization of original projects. Students may focus on studio composition, software development or analytic research. Appropriate compositional techniques and problem solving strategies are also discussed. Enrolment in this course is limited.

Prerequisite: Music 30.363★ or permission of the Department.

Day division, Winter term: Lectures three hours a week, plus individual studio time.

Music 30.365★**Electronic Music Techniques**

A study of electronic music techniques and their applications. The course emphasizes tape techniques and includes the study of electro-acoustic instruments and sound processing. Enrolment in this course is limited.

Prerequisite: Music 30.362 taken prior to 1987-88.

Prerequisite: Permission of the Department.

Day division, Fall term: Lectures three hours a week, plus individual studio time.

Music 30.366★**Electronic Music Projects**

A continuation of Music 30.365★. Students are guided through basic techniques of electronic music in the realization of original projects. Appropriate compositional and technical methods are discussed. Enrolment in this course

is limited.

Precludes additional credit for Music 30.362 taken prior to 1987-88.

Prerequisite: Music 30.365★ or permission of the Department.

Day division, Winter term: Lectures three hours a week, plus individual studio time.

Music 30.390★**Performance III**

A continuation of Music 30.290★ for B.Mus. and B.A. (Option A) students only. A brief prepared recital before a jury is required at the end of the year.

Prerequisite: Music 30.290★ or permission of the Department.

Individual tuition one hour a week.

Music 30.420★ to 30.424★**Special Topics**

Courses focusing on one selected aspect of music, in the area of either musicology, theory or composition. The course offerings change from year to year.

Prerequisite: Permission of the Department.

Music 30.425★ to 30.429★**Specialized Studies**

Courses designed specifically for music Honours students who have acquired an extensive background through courses in theory, musicology or composition. The course offerings change from year to year.

Prerequisite: Permission of the Department.

Music 30.430★**Notation of Medieval and Renaissance Music**

An introduction to the notation of medieval and renaissance music with emphasis on the major paleographic and transcriptional problems to be encountered in early chant notation, square and Franconian notations, the innovations of the Ars Nova and mannerist phases, white notation, and various lute tablatures. Examples are selected, for detailed study and transcription, from the ninth to sixteenth centuries.

Prerequisite: Music 30.210★ or permission of the Department.

Day division, Winter term: Lectures three hours a week.

B. Gillingham

Music 30.431★**Twentieth-Century Musical Notation**

A seminar in twentieth-century notation, considering the modification of existing systems to accommodate new compositional and performance practices and the development of new systems. Topics discussed include the psychology of notation, information theory in music, classification systems, graphic notation, indeterminate scores and calligraphic techniques.

Prerequisite: Music 30.216★ or permission of the Department.

Not offered 1990-91.

Music 30.460**Composition III**

A continuation of Music 30.360 for students who possess a displayed aptitude for composition. The course centres around the writing of original works of substantial proportions and for a variety of media. Students are encouraged to prepare some of their music for public performance.

Prerequisite: Permission of the Department.

Small-group tutorial one hour a week.

D. Piper

Music 30.471★

Music as Social Knowledge

This course examines music as social knowledge from the perspective of the sociology of knowledge. The principal topic to be examined is the attitude of different groups to different styles of music. A substantial part of the course is given over to a consideration of recent work in the sociology of music education.

Prerequisite: Permission of the Department.

Evening division, Winter term: Lectures three hours a week.

Music 30.472★

Theory and Method in Musicology

This course traces the historical development of the sub-disciplines of historical musicology, ethnomusicology and sociomusicology, and critically examines the different theories and methods to which these sub-disciplines have given rise.

Prerequisite: Permission of the Department.

Day division, Fall term: Lectures three hours a week.

Music 30.490★

Performance IV

A continuation of Music 30.390★ for B.Mus. students only. A brief prepared recital before a jury is required at the end of the year.

This course *may not* be taken in addition to or concurrently with Music 30.497.

Prerequisite: Music 30.390★ or permission of the Department.

Individual tuition one hour a week.

Music 30.495

Performance (Diploma in Music)

A full credit in performance designed exclusively for Diploma in Music candidates.

Individual tuition one hour a week.

Music 30.496

Honours Portfolio in Composition

A project involving the preparation, performance and written analysis (of approximately 20 pages) of an original work (or works) of substantial length, prepared in consultation with the Department and an assigned adviser. This course is open only to B.Mus. students who have demonstrated a strong aptitude for composition.

Prerequisite: Permission of the Department.

Music 30.497

Graduating Recital

Open only to B.Mus. students who have demonstrated a strong aptitude for performance. The course requires preparation of a public performance of at least one hour duration arranged in consultation with Director of Performance Studies and teacher.

Precludes additional credit for Music 30.490★.

Prerequisite: Permission of the Department.

Individual tuition one hour a week.

Music 30.498

Honours Essay in Musicology

An Honours research essay of approximately 50 pages in length on a topic chosen in consultation with the Department and an assigned supervisor. A high level of personal research and subsequent presentation is required. This course is open only to B.A. (Hons.) and B.Mus. students who have demonstrated a strong aptitude for research and writing.

Prerequisite: Permission of the Department.

Music 30.510, 30.511★, 30.512★, 30.515★

Graduate Studies in Canadian Music

See Graduate Studies and Research Calendar.

Members of the Committee

I.S. Pressman, Program Co-ordinator
Room 823 Dunton Tower, 788-2165 or 788-2155

W.H. Cunningham
S.E. Mills

General Information

The Department of Mathematics and Statistics offers a B.A. (Honours) program in Operations Research.

Operations Research (O.R.) began as a discipline about fifty years ago, and is concerned with the study and application of scientific methods of making decisions. Operations Research techniques are used extensively in business and industry for financial planning and economic modelling, allocating resources, scheduling of personnel and machinery, routing vehicles, designing networks, and determining optimal product mixes.

There is also considerable theoretical activity in areas such as economics, business, the study of algorithms, stochastic modelling, queueing, etc., which have many practical applications.

The program at Carleton University was designed in consultation with employers of O.R. professionals and the Canadian Operations Research Society. Graduates of this program will be prepared for careers either in government or in the private sector, and they will be qualified to continue in graduate programs.

Operations Research at Carleton University is exclusively an Honours program. Those students who prefer a Management-Business-Social Science orientation would normally proceed towards a B.A. (Honours) degree. Students who select a program with an orientation towards Mathematics-Physical Science-Computer Science should proceed towards a B.Sc. (Honours) degree. An Honours project (Mathematics 70.495★) is a required component of either degree program.

Students who are planning to apply for admission to this program should have good quantitative skills. The required courses provide a broad range of O.R. techniques and methodologies which include: statistical analysis, stochastic processes, linear and non-linear optimization, network theory, mathematical modelling and computer simulation. It is strongly recommended that students acquire an understanding of the human side of the O.R. discipline through study within the Social Sciences.

Students who are considering this program are urged to meet with the program coordinator to discuss their interests. The committee is available to advise students within the program.

Admission Requirements

The admission requirements for this program are as specified for the B.A. Honours program (see p. 31) or the B.Sc. Honours program (see p. 35).

Course Requirements

For full details of course requirements see p. 401.

Dunton Tower, Room 2125
Telephone: 788-2110

Officers of Instruction

Chairperson
Andrew Jeffrey

Pass Program Adviser
John W. Leyden

Honours Program Adviser
Stephen Talmage

Graduate Studies Supervisor
J. Andrew Brook

Professor
Bernard Wand

Associate Professors
J.A. Brook
Stanley G. Clarke
B.I. Egyed
Marvin Glass
Andrew Jeffrey
Randal R.A. Martin
Stephen Talmage
James M. Thompson
J. Wolfe

Assistant Professors
J. Drydyk
D.E. Dubrule
John W. Leyden

Sessional Lecturer
Christine Koggel

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Courses Open to First-Year Students

The following courses are open to First-year students: Philosophy 32.110, 32.150, 32.160 (full-credit courses); 32.101★, 32.102★, 32.103★, 32.106★, 32.107★, 32.184★, 32.201★, 32.203★, 32.209★ (half-credit courses.) Please note that not all of these courses are offered each year. No more than 2.0 credits at the 100 level may be used to satisfy requirements for graduation in any degree program.

Pass Program

Students in the Pass program in Philosophy will present a minimum of 6.0 credits in Philosophy including 5.0 credits beyond the 100 level.

These credits must be chosen to include 1.0 credit in History of Philosophy. History of Philosophy courses are: 32.205, 32.215, 32.220, 32.225, 32.270, 32.286★, 32.287★, 32.305, 32.310 and 32.380.

Special arrangements will be made for students proposing a Combined Pass program. The normal requirement in Philosophy is 5.0 credits, including 4.0 beyond the 100 level.

All Pass and Combined Pass program students will arrange their programs in consultation with the Department.

Honours Program

The Honours program may be entered at the beginning of the First year or by transfer from the Pass program. Students intending to enter the Honours program are advised to include 1.0 credit in Philosophy at the 100 level in the First-year program. In certain circumstances this requirement will be waived for students entering the Honours or Combined Honours program after the First year, who may be permitted to substitute an upper-year credit in Philosophy.

The Honours program consists of a minimum of 20.0 credits, with at least 9.0 credits in Philosophy. A minimum of 8.0 credits in Philosophy must be beyond the 100 level. The program for the Second and subsequent years is planned in consultation with the Department. Courses must be chosen according to the following requirements:

1. 2.0 credits in history of philosophy;
2. 2.0 credits in problems in philosophy;
3. 1.0 credit in moral and/or political philosophy;
4. Either 1.0 credit in Logic or 0.5 credit in Logic and another 0.5 credit in Philosophy;
5. 2.0 credits at the 400 or 500 level.

Courses falling within the foregoing groups are:

History of philosophy: 32.205, 32.215, 32.220, 32.225, 32.270, 32.286★, 32.287★, 32.305, 32.306★, 32.310, 32.380;

Problems in philosophy: 32.200, 32.240, 32.245★, 32.246★, 32.251★, 32.252★, 32.260, 32.280, 32.284★, 32.290, 32.311★, 32.312★, 32.332★, 32.333★, 32.351★, 32.366★;

Moral and/or political philosophy: 32.202, 32.209★, 32.211★, 32.212★, 32.236★, 32.266★, 32.330;

Logic: 32.201★, 32.335, 32.336★.

Combined Honours Programs

Combined Honours programs are available in Philosophy with the following subjects: Art History, English, History, Journalism, Law, Political Science, Greek, Economics, French, German, Mathematics, Psychology, Religion and Sociology-Anthropology. Special arrangements may be made for other combinations.

The Philosophy requirements are 7.0 credits, to include 6.0 credits beyond the 100 level of which 1.0 credits must be at the 400 or 500 level. Details of these programs may be obtained from the Department.

Mention: français

Students in the Pass or Honours program in Philosophy may qualify for the notation "Mention: français" (p. 41) by fulfilling the requirements outlined below. Those wishing to pursue this path should consult with the Department's Pass or Honours adviser. Approval of the relevant adviser is required for all courses under the "Mention: français."

Philosophy courses presented in fulfillment of the "Mention: français" requirements can double as courses to satisfy Philosophy Pass or Honours requirements.

Pass or Combined Pass

To graduate with the notation "Mention: français", students must include in the program the following:

1. One credit in French language chosen in consultation with the Department of French for the purpose of perfecting the student's French language skills.
2. One credit from the following list of courses taught in French at Carleton and concerned with the study of the heritage and culture of French Canada: French 20.267★, 20.268★, 20.281★.
3. Either Philosophy 32.399 (Independent Study) with philosophical works read in French and papers submitted in French to be assessed by two members of the Department of Philosophy knowledgeable in the language, or one credit in Philosophy at the 300 level taught in French at another university and acceptable to the Department of Philosophy.
4. Students in Combined Pass programs must meet the "Mention: français" requirements of both disciplines.

Honours or Combined Honours

To graduate with the notation "Mention: français", students must include in their program the following:

1. same as 1 above
2. same as 2 above
3. same as 3 above
4. Either a special project (Philosophy 32.490 tutorial) in French, supervised by a member of the Department of Philosophy or one credit earned in a Philosophy seminar or seminars at the 400 level taught in French at another university and acceptable to the Department of Philosophy. Students who choose the latter must, in addition, satisfy the Honours requirement of 2.0 Carleton credits at the 400 or 500 level in Philosophy (1.0 for Combined Honours).
5. Combined Honours students must meet the "Mention: français" requirements of both Honours disciplines.

Graduate Program

The Department of Philosophy offers studies leading to the degree of Master of Arts. For information see the Graduate Studies and Research Calendar, or consult the department Graduate Studies Supervisor.

Courses Offered

Philosophy 32.101★
Ethics and Philosophy of Religion

An examination of arguments for and against the existence of God; the nature of religious language and the meaning and justification of moral judgments.
Not offered 1990-91.

Philosophy 32.102★
Knowledge and Meaning

The justification of our belief in an external world and in the possibility of predicting the future, the nature of knowledge and of ultimate reality, the nature of language and the meaning of "meaning."
Not offered 1990-91.

Philosophy 32.103★
Philosophical Texts I

An examination, both historical and critical, of selected philosophical texts. Works to be studied include Plato, *The Republic* and Descartes, *Meditations*.
Evening division, Fall term: Lectures and discussion two and a half hours a week.

Philosophy 32.106★
Metaphysics and Truth

A discussion of the following questions: how mind is related to body; what freedom is and whether it is possible; what truth is and how philosophical truths differ from truths of science.
Not offered 1990-91.

Philosophy 32.107★
Philosophical Texts II

An examination, both historical and critical, of selected philosophical texts. Works to be studied include Hume, *An Enquiry Concerning Human Understanding*; Ayer, *Language, Truth and Logic*.
Not offered 1990-91.

Philosophy 32.110
Looking at Philosophy

An introduction to philosophy through an examination of the following questions: What is logical thinking? Does God exist? Are values relative? Do we have responsibilities? What is a just society? Do we have free will? What is the mind? What is the nature of reality? Can we know anything for certain?

This course is not intended for Majors (Pass or Honours) in Philosophy.

Day division: Lectures and discussion three hours a week.
A. Brook, S. Talmage

Philosophy 32.150
Contemporary Moral, Social and Religious Issues

A critical examination of some of the philosophical problems associated with such topical issues as feminism (e.g. marriage, the family, abortion and sexual ethics); atheism vs. theism; the meaning of life (e.g. existentialism); moral relativism vs. moral objectivism; egoistic vs. non-egoistic ethics (e.g. Ayn Rand and utilitarianism); euthanasia and capital punishment; legal paternalism (e.g. "hard" and "soft" drugs, suicide, medicare); freedom of the will.

Day division: Lectures and discussions three hours a week.
Evening division: Lectures and discussion two and a half hours a week.

Section A, M. Glass; Section B, J. Drydyk

Philosophy 32.160

History of Philosophy

A study of the major figures and developments in philosophy from the early Greeks to the present. The approach is primarily descriptive and comparative, though an appreciation of critical reasoning is included for comprehending philosophical developments. This course is intended to provide a background from which to understand the philosophical aspects of other disciplines as well as the further study of philosophy.

Day division: Lectures and discussion three hours a week.
S. Clarke

Philosophy 32.184★

Introduction to Environmental Ethics

An introduction to major questions in environmental ethics, including: How should human beings view their relationship to the rest of nature? Is responsible stewardship of the environment compatible with current technology? Do distinct forms of life, for example endangered species, have value? Do animals, other life-forms, ecosystems and/or the biosphere have rights? Is the right to liberty and property compatible with protecting the environment and meeting our obligations to future generations?

Day division, Winter term: Lectures and discussion three hours a week.
A. Brook

Philosophy 32.200

Science and the Human

Topics include the scientific view of the world, scientific revolutions and the growth of knowledge and objectivity. Specific attention is paid to fundamental concepts such as observation, explanation, causation and induction. The course concludes with an examination of the biological and social sciences.

Prerequisite: A course in Philosophy or Second-year standing.

Not offered 1990-91.

Philosophy 32.201★

Logic

An introduction to the techniques and philosophical implications of formal logic with emphasis on the following issues: translation of expressions into symbolic form, formulation and application of the rules of valid inference, the relation between logic and language, and the nature of logical necessity.

Open to First-year students.

Day division, Fall term: Lectures and workshops three hours a week.

Day division, Winter term: Lectures and workshops three hours a week.

J. Leyden

Philosophy 32.202

Ideas of the Individual and Society in Canada

An examination of Canadian ideas of the individual, culture and society in the context of their philosophical traditions. Emphasis is placed on the themes of nationalism; human interaction with the natural and technical environment; the individual's relation to the past, society and culture; and the ideological aspects of traditionalism, social reform and revolution. The following representatives of Canadian thinking, among others, are discussed: G. Grant, C.B. McPherson, F. Dumont.

Prerequisite: A course in Philosophy or Second-year standing.

Not offered 1990-91.

Philosophy 32.203★

Informal Reasoning

A practical course to aid the student in the assessment of reasoning and the development of cogent patterns of thinking. Reference to formal logic is minimal and employed only where it will assist in clarification. A significant part of the course work is practice in criticizing examples of reasoning and in formulating one's own reasons correctly and clearly.

Open to First-year students.
Precludes additional credit for Philosophy 32.120 (no longer offered)

Day division, Fall term: Lectures three hours a week.

S. Talmage

Evening division, Winter term: Lectures two and a half hours a week.

J. Drydyk

Philosophy 32.205

Greek Philosophy

An examination of early speculation in Greece, the roles of the Sophists and of Socrates, together with a study of selected topics in the works of Plato and Aristotle. (Also listed as Classical Civilization 13.240).

Prerequisite: A course in Philosophy or Second-year standing.

Day division: Lectures and discussion three hours a week.
A. Jeffrey

Philosophy 32.209★

The Philosophy of Economic Activity

An examination of economic activity as it relates to the principles of social organization, moral rules and religious attitudes. Among the themes receiving special attention are: the nature of property, competition and planning, the status of work, corporate rights and responsibilities, profits and social needs, and distributive justice.

Open to First-year students.

Not offered 1990-91.

Philosophy 32.211★

History of Ethics

An examination of historical discussions of some principal questions in moral philosophy: e.g. Hobbes on egoism and obligation, Butler on conscience, Kant on moral principles, Hume or J.S. Mill on utilitarianism.

Prerequisite: A course in Philosophy or Second-year standing.

Day division, Fall term: Lectures and discussion three hours a week.

Philosophy 32.212★

Contemporary Ethical Theory

A critical approach to the nature of morality, the meaning of moral language and the justification of moral claims studied through influential twentieth century writings. G.E. Moore, C.L. Stevenson, R.M. Hare and Philippa Foot set the context for more recent contributions.

Prerequisite: A course in Philosophy of Second-year standing.

Day division, Winter term: Lectures and discussion three hours a week.

Philosophy 32.215

Modern Philosophy: 1600-1800

An examination of the major philosophical writers of the seventeenth and eighteenth centuries. Selections are studied from the works of Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume.

Prerequisite: A course in Philosophy or permission of the Department.

Day division: Lectures and discussion three hours a week.
J. Leyden

Philosophy 32.220

Introduction to Marxist Philosophy

This course focuses primarily on the philosophical writings of Marx, Engels and Lenin. Materials used are intended to give the student an understanding of the Marxist world-outlook as a whole, and at the same time of the Marxist approach to such special branches of philosophy as theory of history, theory of knowledge, social and political philosophy, philosophy of science and ethics. Topics such as materialism vs. idealism, dialectical vs. non-dialectical thinking, absolute vs. relative truth, freedom vs. necessity, human nature, alienation, and ideology will be discussed. Secondary source material includes the writings of both proponents and critics of Marxism.

Prerequisite: A course in Philosophy or Second-year standing.

Not offered 1990-91.

Philosophy 32.225

Reason and Revelation

A study of the evolution of western philosophy up to the end of the Renaissance. Theories of human nature, knowledge and reality are traced from the early rationalism of the Greeks through the syntheses of reason with Christianity in the Middle Ages to the humanist rationality of the Renaissance. In-depth studies are made of six important thinkers: Plotinus, Augustine, Thomas Aquinas, William of Ockham, Montaigne and Francis Bacon.

Prerequisite: A course in Philosophy or Second-year standing.

Day division: Lectures and discussion three hours a week.
D. Dubrule

Philosophy 32.236★

Philosophy and Feminism

A study of philosophical issues arising from feminism. The course includes discussions of the relations between feminism, reason and ideological commitment, as well as critical evaluation of contemporary views on selected topics (e.g. abortion, pornography and censorship, affirmative action, and beauty).

Prerequisite: A course in Philosophy or Second-year standing.

Evening division, Fall term: Lectures and discussion two and a half hours a week.

M. Glass

Philosophy 32.240

Aesthetics

Analysis of problems in the description, interpretation and evaluation of works of art, including music, literature and the visual arts, together with the study of types of aesthetic theory.

Prerequisite: A course in Philosophy or Second-year standing.

Day division: Lectures and discussion two hours a week.

J. Thompson

Philosophy 32.241★

Aesthetics

The first half of Philosophy 32.240, Aesthetics. (For Architecture students only.)

Prerequisite: Permission of the Department. Only for students who will take Philosophy 32.242★ in a later year.

Day division, Fall term: Lectures and discussion two hours a week.

J. Thompson

Philosophy 32.242★

Aesthetics

The second half of Philosophy 32.240, Aesthetics. (For Architecture students only.)

Prerequisite: Philosophy 32.241★.

Day division, Winter term: Lectures and discussion two hours a week.

J. Thompson

Philosophy 32.245★

Philosophy of the Paranormal

A philosophical examination of claims, concepts, theories and methods in parapsychology as well as astrology and other occult studies. Consideration is given to the question of their scientific character and the relation of paranormal and occult phenomena to philosophical issues such as survival of death, the immortality of the soul and human nature, time, space, causality and perception. Specific topics dealt with vary from year to year, but the following are likely to be included: telepathy, clairvoyance, precognition, retrocognition, psychokinesis, out-of-body experiences, mental mediumship, demonic possession, apparitions and time travel.

Prerequisite: A course in Philosophy or permission of the department.

Not offered 1990-91.

Philosophy 32.246★

Death

A study of some major issues in philosophical thanatology. Problems considered include philosophical concepts of death, medical and legal definitions of death and the meaning and implications of some ways of dying: suicide, euthanasia, infanticide, abortion, murder and capital punishment. (Students are reminded of complementary courses: Philosophy 32.245★ and 32.251★ and Religion 34.238★.)

Prerequisite: A course in Philosophy or permission of the Department.

Not offered 1990-91.

Philosophy 32.251★

Personal Identity and the Self

The course is centred on the concept of personal identity and the problem of the relation of the mind to the body. Both psychological and philosophical concepts of personal identity are delineated and discussed. In the treatment of the mind/body problem, contemporary views are emphasized, with special emphasis on the scope and limits of introspection.

Prerequisite: A course in Philosophy or permission of the Department.

Day division, Fall term: Lectures and discussion three hours a week.

A. Brook

Philosophy 32.252★

Philosophy of Mind

An examination of contemporary work on some major conceptual problems to do with the mind. Topics often include: the nature of intentional systems, mental images, dreams, consciousness and artificial intelligence, pain, self-deception, mental illness, and what it is to treat someone as a person. Particular attention is paid to the views of philosophers working within cognitive science.

Prerequisite: Philosophy 32.251★.

Day division, Winter term: Lectures and discussion three hours a week.
A. Brook

Philosophy 32.260

Philosophy of Religion

A philosophical examination of some characteristic concepts of religion, such as faith, hope, worship, revelation, miracle, God. (Also listed as Religion 34.260.)

Prerequisite: A course in Philosophy or Second-year standing.

Not offered 1990-91.

Philosophy 32.266★

Personal Ideals and Lifestyles

Problems of describing, analyzing and evaluating personal ideals and lifestyles are investigated. Emphasis is given to the works of Iris Murdoch and Albert Camus.

Prerequisite: a course in Philosophy or Second-year standing.

Day division, Fall term: Lectures and discussion three hours a week.

S. Clarke

Philosophy 32.270

Existentialism and Phenomenology

A study of recent and contemporary philosophical movements in continental Europe. An account is given of the historical origins of these movements in the thought of Kierkegaard and Husserl. Special attention is paid to the philosophy of Sartre. The views of Nietzsche, Heidegger, Camus and Merleau-Ponty, together with those of some of their commentators, are also discussed.

Prerequisite: A course in Philosophy or Second-year standing.

Not offered 1990-91.

Philosophy 32.280

Language and Communication

Among theories about the nature of language that the course examines are those of Skinner and the behaviorists; of Chomsky and other transformation-generative grammarians; and of the speech-act theorists. Among questions to which an answer is attempted are: What is language? What is meaning? What is it to communicate? Philosophical issues with respect to such topics as the following are considered: language and innate knowledge; language and culture; translation; the origins and acquisition of language; nonverbal communication; nonhuman language; machine languages; ideal languages; normative grammar and "correct" speech. (Also listed as Mass Communication 27.280 and Linguistics 29.280.)

Prerequisite: A course in Philosophy or Second-year standing.

Day division: Lectures and discussion three hours a week.
S. Talmage

Philosophy 32.284★

Society, Value and Technology

An examination of some ethical problems raised by actual and conceivable advances in technology. In the light of the present and future supply of resources, the modern urban environment and communication systems, what sort of society should we strive for? Specific issues dealt with include genetic engineering, obligations to future generations, triage and fair distribution of the world's vital resources, privacy and social control and the ideas of progress and growth.

Prerequisite: A course in Philosophy or permission of the Department.

Day division, Fall term: Lectures and discussion three hours a week.

R.R.A. Marlin

Philosophy 32.286★

Art and Ideas: From Ancient Greece to the Twentieth Century

A survey of theories that have shaped the Western approach to art and art criticism, including Plato, Aquinas, Kant, Hegel and Nietzsche. (Offered in the Department of Art History as Art History 11.286★.)

Philosophy 32.287★

Art and Ideas: The Twentieth Century

A survey of theories that have shaped the Western approach to art and art criticism including psychological, sociological, phenomenological, semiotic and aesthetic approaches and including such thinkers as Freud, Arnheim, Marx, Heidegger, Barthes and Bell. (Offered in the Department of Art History as Art History 11.286★.)

Philosophy 32.290

Truth and Propaganda

A study of techniques, ancient as well as modern, for influencing public opinion. The ethics of various attempts to control, affect or modify mass consciousness, under circumstances of wartime or peace, by the state, political parties, commercial interests or pressure groups, are discussed. Attention is paid to definition of key terms such as "propaganda", "manipulation" and the like, in the light of shifting nuances of different times and usages. The problem of arriving at a satisfactory definition of "truth" to compare or contrast with "propaganda" is one focal point of investigation. The values of an open society, as against those promoted by closed societies, also receive attention, account being taken of subtler as well as more obvious forms of censorship, and of external as well as internal attempts to influence or subvert public consciousness in a given society. (Also listed as Mass Communication 27.290.)

Prerequisite: A course in Philosophy or Second-year standing.

Evening division: Lectures and discussion three hours a week.

R.R.A. Marlin

Philosophy 32.305

German Philosophy: Eighteenth and Nineteenth Centuries

An examination of some major German philosophers of the late eighteenth and nineteenth centuries, including Kant, Hegel, Schopenhauer, Marx and Nietzsche.

Prerequisite: Third-year standing or permission of the Department

Day division: Lectures and seminars three hours a week.
R.R.A. Marlin, J. Thompson

Philosophy 32.306★

Kant to Hegel

The development of German idealism from Kant to Hegel. Prerequisite: Third-year standing or permission of the Department.

Day division, Fall term: Lectures and seminars three hours a week.

J. Thompson

Philosophy 32.310

History of Contemporary Philosophy

A study of analytic, hermeneutic and pragmatic

philosophies and their interaction. The focus is on major figures in these approaches such as Russell, Wittgenstein and Carnap in analytic philosophy, Heidegger and Gadamer in hermeneutics, and Quine, Goodman and Rorty in pragmatism.

Prerequisite: 1.0 credits in Philosophy.

Not offered 1990-91.

Philosophy 32.311★

Philosophy of Law: The Nature of Law

This course involves a consideration of the concept of law, and of those concepts that are commonly associated with it, viz. rules, obligations, authority, coercion, and force. (Also listed as Law 51.311★.)

Prerequisite: A course in Philosophy or permission of the Department.

Philosophy 32.312★

Philosophy of Law: The Logic of Law

This course examines legal reasoning and analyzes concepts of particular significance to the law. These include justice, rights and duties, liability, punishment, ownership and possession. (Also listed as Law 51.312★.)

Prerequisite: Philosophy 32.311★ or permission of the Department.

Day division, Winter term: Lectures and discussion three hours a week.

R.R.A. Marlin

Philosophy 32.330

Social and Political Philosophy

An analysis of the concepts used to explain and justify social and political thinking or action: state, society, the common good, justice, rights and obligations, punishment and liberty, and a consideration of the moral basis of political obligation.

Prerequisite: A course in Philosophy or Second-year standing.

Day division: Lectures and discussion two and a half hours a week.

J. Drydyk

Philosophy 32.332★

Issues in the Philosophy of Science

An introduction to the main currents of post-positivist philosophy of science. The main concepts discussed in the course include: truth, meaning, testability, theory ladenness, progress, induction, objectivity, rationality, explanation and paradigms. An attempt is made to trace the use of these concepts and the various philosophical problems to which they give rise from early twentieth century positivism through the writings of Karl Popper and Thomas Kuhn to the writings of Paul Feyerabend, Imre Lakatos and Mary Hesse.

Prerequisite: A course in Philosophy or Second-year standing.

Day division, Winter term: Lectures and discussions three hours a week.

J. Leyden

Philosophy 32.333★

Science and the Structure of Society

An introduction to the ideas of the Frankfurt School, of Hermeneutics, and of Structuralism. The views of Horkheimer, Habermas, Ricoeur, Althusser and Foucault on the value of scientific discourse and the nature of the critical study of society are examined in some detail.

Prerequisite: A course in Philosophy or Second-year standing.

Not offered 1990-91.

Philosophy 32.335

Logic

An introduction to symbolic logic together with a discussion of some problems in the philosophy of logic.

Precludes additional credit for Philosophy 32.336★.

Prerequisite: A course in Philosophy or permission of the Department.

Not offered 1990-91.

Philosophy 32.336★

Symbolic Logic

A review of the basic techniques of propositional and predicate logic. Natural deduction and consistency trees. Soundness and completeness. Alternative semantics. Extensions to basic logic: identity, modal logic with possible world semantics, three valued systems, deontic logic.

Prerequisite: Philosophy 32.201★ or permission of the Department.

Precludes additional credit for Philosophy 32.335.

Not offered 1990-91.

Philosophy 32.351★

Philosophy of Computing

Can machines think? The course begins with an overview of research results concerning "artificial intelligence," followed by a discussion of theoretical limits to computing. Further topics to be considered may include the information-processing view of the mind/brain problem, Searle's paradox and Weizenbaum on what ought not to be computed.

Prerequisite: One credit in Philosophy or Second-year standing in Computer Science.

Not offered 1990-91.

Philosophy 32.366★

Philosophies of Love

Philosophical theories of love are studied with emphasis on their implications for understanding human nature and developing moral ideals.

Prerequisite: A course in Philosophy or Second-year standing.

Recommended background: Philosophy 32.266★.

Not offered 1990-91.

Philosophy 32.380

Moore, Russell, Wittgenstein

A brief account of the Idealism of Bradley sets the context for a study of the reactions of Moore and Russell. Their contributions to metaphysics, theory of knowledge and linguistic analysis are examined and compared with the early views of Wittgenstein. In the Winter term there is a concentrated study of the later work of Wittgenstein. The approach is both interpretive and problem-oriented.

Prerequisites: Two credits in Philosophy.

Not offered 1990-91.

Philosophy 32.399

Independent Study

Normally restricted to students with at least three credits in Philosophy and with high standing in Philosophy courses. The students submit topics for approval and present papers for grading.

Prerequisite: Permission of the Department.

Philosophy 32.401★

Philosophy of Language

Prerequisite: Final-year Honours standing in a Philosophy program or permission of the Department.

Day division, Fall term.

S. Talmage

Philosophy 32.402★

Philosophy of Social Science

Current practices of theory-building, confirmation and explanation in the social sciences are studied. Issues such as the following are addressed: Does science form a unity? In what manner can one theory or science be reduced to another? Should standards for confirmation vary from one science to another? Is there any privileged form of explanation?

Prerequisite: Final-year Honours standing in a Philosophy program or permission of the Department.

Day division, Fall term.

S. Clarke

Philosophy 32.411★

Philosophy of Action

Prerequisite: Final-year Honours standing in a Philosophy program or permission of the Department.

Not offered 1990-91.

Philosophy 32.421★

Epistemology

Prerequisite: Final-year Honours standing in a Philosophy program or permission of the Department.

Not offered 1990-91.

Philosophy 32.431★

Philosophy of Logic

Prerequisite: Final-year Honours standing in a Philosophy program or permission of the Department.

Not offered 1990-91.

Philosophy 32.441★

Contemporary Moral or Political Philosophy

An intensive study of recent works in one or both of these areas.

Prerequisite: Final-year Honours standing in a Philosophy program or permission of the Department.

Day division, Winter term.

M. Glass

Philosophy 32.451★

Philosophy and Theories of Mentality

A study of some philosophical issues arising from psychology, biology, cognitive science and neuroscience.

Prerequisite: Final-year Honours standing in a Philosophy program or permission of the Department.

Not offered 1990-91.

Philosophy 32.461★

Philosophy of Religion

Prerequisite: Final-year Honours standing in a Philosophy program or permission of the Department.

Not offered 1990-91.

Philosophy 32.471★, 32.472★

Special Topic in Greek Philosophy

Not offered 1990-91.

Philosophy 32.473★, 32.474★

Special Topic in Medieval Philosophy

Day division, Fall term.

D. Dubrule

Philosophy 32.475★, 32.476★

Special Topic in Early Modern Philosophy

Not offered 1990-91.

Philosophy 32.477★, 32.478★

Special Topic in Nineteenth Century Philosophy

Not offered 1990-91.

Philosophy 32.479★, 32.480★

Special Topic in Twentieth Century Philosophy

Day division, Winter term.

A. Brook

Philosophy 32.490

Tutorial

Prerequisite: Permission of the Department.

Philosophy 32.491★

Tutorial

Prerequisite: Permission of the Department.

Philosophy 32.492★

Tutorial

Prerequisite: Permission of the Department.

Note:

Students who wish to enroll in a tutorial course must consult the Honours Adviser, preferably *before* registration.

Graduate Course Open to Undergraduate Students

The following graduate course may, with permission, be taken by Honours and Combined Honours students in their final year.

Philosophy

32.580 Graduate Seminar

Department of Political Science

205

Loeb Building, Room B640
Telephone: 788-2777

Adjunct Professors
Douglas G. Anglin
Alain G. Gagnon
Peyton V. Lyon

Officers of Instruction

Chair
Jon H. Pammett

Assistant Chair
Chris Brown

Supervisor of Graduate Studies
Jane Jenson

Assistant Supervisor of Graduate Studies
Miriam C. Smith

Supervisor of Undergraduate Studies
P.L. Rosen

Professor Emeritus
Henry B. Mayo

Professors
Bohdan R. Bociurkiw
Michael B. Dolan
Robert J. Jackson
Carl G. Jacobsen
Jane Jenson
Kenneth D. McRae
Maureen A. Molot
Lynn K. Mytelka
Jon H. Pammett
Teresa Rakowska-Harmstone
Donald C. Rowat
Radoslav Selucky
John H. Sigler
V. Subramaniam
Brian W. Tomlin
Jill McCalla Vickers
Harald von Riekhoff
Michael S. Whittington
V. Seymour Wilson
Conrad J. Winn

Associate Professors
Jon Alexander
Scott E. Bennett
Nguyen H. Chi
Thomas Darby
Peter C. Emberley
Linda Freeman
Willard A. Mullins
Waller R. Newell
George Roseme
Paul L. Rosen
Elliot L. Tepper
Glen B. Toner
Glen Williams

Assistant Professors
David J. Bellamy
Chris Brown
Barbara L. Jenkins
Charles F. Schuetz

Lecturer
Miriam C. Smith

General Information

Ottawa provides a wealth of resources, both in personnel and in research materials, for the student of government, politics, public administration and international relations. Undergraduates will be assisted in making the fullest use of these unique advantages of the national capital. The Department of Political Science offers courses in the following fields of study: Canadian government and politics, comparative institutions and politics, public administration and public policy, international relations, political theory and methodology.

Students should note that it is possible to combine a Pass or Honours program in Political Science with a pattern of studies, such as urban studies, studies in developing areas, etc. Those wishing to do so should consult the Department for a suggested outline of courses.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Pass Programs

A Pass program in Political Science requires Political Science 47.100; one of 47.230 or 47.270; and four or more additional credits in Political Science.

First-year students intending to enter a Pass (or Honours) program in Political Science should note that they may take a 200-level course concurrently with Political Science 47.100.

A Combined Pass program, including Political Science, requires Political Science 47.100 and three or more additional credits in Political Science.

Pass students should take a number of courses in related social sciences. Final-year Pass program students with the required standing may, with permission, be admitted to 400-level Honours courses, provided space is available. The entire program must be approved by the Department.

Pass students must maintain a 4.0 (C-) grade-point average in Political Science.

Honours Programs

The Honours programs may be entered in the First year, or by transfer from Pass programs, if sufficient standing has been obtained. Only students whose past record indicates the ability to meet the Department's language requirement, and to obtain at least a B- in the Honours Essay will be recommended for Fourth-year Honours. An Honours student may be approved for a Pass degree at the end of the

Third year if the requirements under the Pass program have been completed. The following programs are available.

Honours in Political Science

For full Honours, 20 credits will be required, including at least nine credits in political science. The Political Science credits must comprise:

1. Political Science 47.100, 47.230, 47.270 and 47.498;
2. One credit (or two half credits), chosen from the following list of courses in Canadian government and politics: Political Science 47.200, 47.201, 47.300★, 47.301★, 47.302★, 47.303★, 47.304★, 47.305★, 47.306★, 47.335★, 47.336★, 47.340, 47.366★, 47.367★, 47.400, 47.401, 47.402★, 47.403★, 47.406★, 47.407★, 47.408★, 47.409★, 47.411★, 47.416★, 47.417★, 47.441★;
3. One credit (or two half credits) chosen from the following list of courses in comparative politics and international relations: Political Science 47.215, 47.260, 47.310, 47.312, 47.314, 47.315, 47.316★, 47.317★, 47.320, 47.321, 47.322, 47.332★, 47.345★, 47.360★, 47.361★, 47.362★, 47.365★, 47.366★, 47.405, 47.412★, 47.413★, 47.414★, 47.415★, 47.420★, 47.421★, 47.422★, 47.440★, 47.460, 47.461★, 47.463★, 47.464★, 47.466★, 47.467★, 47.482★, 47.483★, 47.484★;
4. Three additional credits in Political Science, of which one full credit or two half-credits must be 400-level seminars.

5. *Language requirement.* The Department requires Honours students to have a knowledge of French. This requirement may be satisfied in one of two ways:

(a) Successful completion of one of French 20.106★, 20.108, or 20.109, or an equivalent course approved by the Department. Students with a limited background in French should note that it may be necessary for them to take French 20.100 and/or four recommended courses from the series French 20.101★, 20.102★, 20.103★, 20.104★, 20.105★, 20.107★, in order to be admitted to French 20.108 or 20.109.

(b) The Department conducts language examinations twice each year (November and March). This examination must be successfully completed before registration in the final five credits of the Honours program. If the examination is attempted and failed, the student must then satisfy the language requirement by completing option (a) above.

Students from abroad, whose mother tongue is other than English, or students whose research interests require another language, may obtain permission from the Supervisor of Undergraduate Studies to substitute this language for French.

6. Candidates present a graduation essay on some topic involving independent investigation (Political Science 47.498); they may be examined orally on this essay and must receive at least *B-* in this course.

7. Candidates must select a minor field or fields consisting of three credits in an approved area outside of Political Science.

Combined Honours

Students intending to enter a program combining Political Science with another discipline should, in their First year, take Political Science 47.100 and the introductory course in the other discipline. For Combined Honours at least six credits in Political Science will be required, including:

1. Political Science 47.100, 47.230, 47.270 or its equivalent; one credit chosen from the 400-level seminars

in Political Science; 47.498 unless the Honours Essay is written in the other discipline of the Combined program; (if the other department does not offer an Honours essay, students must take Political Science 47.498);

2. The equivalent of two credits, chosen from requirements 2 and/or 3 listed for the full Honours program. The two credits may be chosen from one list; one of the two credits may be the 400-level seminar;

3. The language requirement as stated for Honours (item 5 above) in Political Science must be completed;

4. The requirements as stated for Combined Honours in the other discipline of the Combined program must be met.

Combined Honours, Journalism and Political Science

Students may select a course pattern that will lead either to the degree of B.A. with Combined Honours in Journalism and Political Science, in which case the Honours Essay will be written for the Department of Political Science, or to the degree of B.J. with Combined Honours in Political Science, in which case the Honours Essay will be written for the School of Journalism. Students in either program must complete 20.5 credits, and they must maintain a standing sufficiently high at all times to satisfy the standards of both the School of Journalism and the Department of Political Science. Please refer to the statement of standing on p. 163 (Journalism) and the regulations of the Faculties of Arts and Social Sciences, pp. 54-66.

Course requirements are:

1. A minimum of six credits in Political Science including: 47.100, 47.230, 47.270 or its equivalent, 47.498 if the student is in the B.A. program, the equivalent of two credits chosen from requirements 2 and/or 3 listed for Honours in Political Science, the equivalent of one credit from the 400-level seminars offered.

2. The Journalism courses normally required under the Honours Journalism program, including Journalism 28.100, 28.200, 28.220, 28.320, 28.351★, 28.421 and 28.498 if the student is in the B.J. program. Students should consult the School of Journalism on course patterns. Note: Journalism 28.320 is a two-credit course.

3. The language requirement as stated for Honours in Political Science (item 5 above) must be completed.

4. An approved course in Canadian history. (Students who wish to practise journalism in another country may be advised to choose a different history course.)

Combined Honours in Political Science and Sociology

Students in this program are required to complete six credits in Political Science including Political Science 47.100, 47.230, the equivalent of one credit from the 400-level seminars in Political Science and 47.498 (if the Honours Essay is written in Political Science). In addition, the student must complete one of the following methodology sequences:

(a) in the Second year, Political Science 47.270; in the Third year, Sociology, 53.370; or

(b) in the Second year, Sociology 53.203 or Anthropology 54.203; in the Third year, Political Science 47.471★ and 47.472★. Students should note that Political Science 47.471★ and 47.472★ may not be offered every year.

Students must also meet requirements 2, 3 and 4 as stated for Combined Honours in Political Science.

Note: See also p. 239 and consult the Department of Sociology and Anthropology.

Honours and Combined Honours Standing

Students must maintain a standing sufficiently high at all times to satisfy the requirements of the Faculties of Arts and Social Sciences, pp. 54-66.

Mention: français

Students who wish to qualify for the "Mention: français" notation in Political Science may do so by taking the following pattern of courses in their degree program:

1. Students must undergo placement testing by the Department of French in order to satisfy the language requirements, and to protect the integrity of the initiative.

2. Advanced language requirement: one credit in the advanced study of the French language (a minimum of French 20.112, no equivalence can be given).

3. French-Canadian culture requirement: one credit in French-Canadian culture and heritage (two of French 20.267★, 20.268★, 20.281★) or another appropriate course in another discipline, given in French, and approved by the "Mention: français" program supervisor, or from an approved list of Second-year courses offered in a related discipline at the University of Ottawa.

4. Discipline requirement: It is recommended that students taking the "Mention: français" course pattern enrol in Political Science 47.201 (Introduction à la politique canadienne). This requirement may also be fulfilled by taking Political Science 47.390, *Études dirigées*.

5. Honours requirement: For an Honours student, there is a requirement for a course or tutorial, or Political Science 47.499, offered by the Department with readings and written work done in French, or an approved course at the University of Ottawa.

Graduate Program

The Department of Political Science offers studies leading to the degree of Master of Arts and to the degree of Doctor of Philosophy. For further details consult the Graduate Studies and Research Calendar.

Courses Offered

Note:

The following is a complete list of all Political Science undergraduate courses. *Please note that all courses are not offered every year.* Students should consult the timetable published in early June for a list of courses that will be offered in 1990-91.

Prerequisites

Except in special circumstances, students are required to have taken the prerequisites listed in the Calendar. Appropriate experience and/or equivalent academic background may be substituted with the permission of the Department.

★ denotes a half-credit course.

• First Year

Political Science 47.100

Introduction to Political Science

An introduction to four areas of concern in the study of contemporary political issues and problems: political thought, focusing upon the clash of modern ideologies such as fascism, socialism, liberalism, communism and nationalism; comparative government, starting from the Canadian system, and including one other western democracy, a communist system and a developing country; international politics; and methods of enquiry.

Day and Evening divisions: Lectures and discussion three hours a week.

• Second Year: Pass and Honours Programs

Political Science 47.200

Canadian Government and Politics

A survey of the political process and political institutions in Canada.

Prerequisite: Political Science 47.100. Third-year students in another discipline will normally be permitted to take this course without having taken Political Science 47.100.

Precludes additional credit for Political Science 47.201.

Day and Evening divisions: Lectures and discussion three hours a week.

Political Science 47.201

Introduction à la politique canadienne

Une vue générale du processus politique et des institutions politiques au Canada. Travaux peuvent être présentés en français ou en anglais.

Precludes additional credit for Political Science 47.200.

Prerequisite: Political Science 47.100.

Lectures and discussion three hours a week.

Political Science 47.215

Comparative Politics

An examination of concepts, theories and methods employed in the study of comparative politics, with particular emphasis on cross-national comparison of regimes and some of the major issues in the field.

Prerequisite: Political Science 47.100.

Lectures and discussion three hours a week.

Political Science 47.230

History of Political Thought

A study of Western political thought from classical times to the nineteenth century. Plato, Aristotle, Machiavelli, Hobbes, Locke, Rousseau and other thinkers are considered.

Precludes additional credit for Political Science 47.231.

Prerequisite: Political Science 47.100. Third-year students in another discipline may normally take this course without having taken Political Science 47.100.

Day and Evening divisions: Lectures and discussion three hours a week.

Political Science 47.260

International Politics

An analysis of the structure and processes of the international system; the interactions of both state and non-state actors (such as multinational enterprises). Contemporary approaches (for example, simulations) to the systematic study of international phenomena are illustrated by reference to current developments such as nuclear proliferation and the tensions between rich and poor nations.

Prerequisite: Political Science 47.100.

Day and Evening divisions: Lectures and discussion three hours a week.

Political Science 47.270

Quantitative Political Science Research Methods

An introduction to quantitative research methods used in political science. The course has four basic components. These are the logic and nature of the quantitative study of politics, research design, data collection methods, and statistical techniques for data analysis. In addition, students have an opportunity to use packaged computer programs in analyzing political and policy-related data.

Prerequisite: Political Science 47.100.

Day and Evening divisions: Lectures and discussion three hours a week.

• **Third Year: Pass and Honours Programs**

Political Science 47.300★

Canadian Provincial Politics

A comparative examination of the nature of Canadian provincial politics. Topics include: political culture, history, party systems, electoral systems and voting behaviour.

Prerequisite: Political Science 47.200 or 47.201.

Lectures and discussion three hours a week.

Political Science 47.301★

Canadian Provincial Government and Intergovernmental Relations

A comparative examination of the institutions of provincial governments, with concentration on the executive and legislature. In addition, attention is focused on the structures and processes of intergovernmental relations, including federal-provincial conferences, selected issues and provincial-municipal relations.

Prerequisite: Political Science 47.200 or 47.201. Political Science 47.300★ is recommended.

Lectures and discussion three hours a week.

Political Science 47.302★

Canadian Municipal Government

An examination of the nature and problems of Canadian municipal government, including metropolitan and regional government and provincial-municipal relations.

Prerequisite: Political Science 47.200 or 47.201.

Lectures and discussion three hours a week.

Political Science 47.303★

Canadian Urban Politics

An examination of the nature and problems of Canadian urban politics.

Prerequisite: Political Science 47.200 or 47.201.

Lectures and discussion three hours a week.

Political Science 47.304★

Political Parties and Elections in Canada

An examination of the evolution of the party system, the growth of major and minor party movements and the electoral process in Canada.

Prerequisite: Political Science 47.200 or 47.201.

Lectures and discussion three hours a week.

Political Science 47.305★

Ontario Government and Politics

A survey of the political process and political institutions in Ontario.

Prerequisite: Political Science 47.200 or 47.201.

Lectures and discussion three hours a week.

Political Science 47.306★

Social Power In Canadian Politics

An examination of the role of social forces in the Canadian political process, including interest groups, social movements, elites and classes.

Prerequisite: Political Science 47.200 or 47.201.

Lectures and discussion three hours a week.

Political Science 47.310

Government and Politics In Africa

The evolution and functioning of African political systems, with emphasis on recent developments in West Central and East Africa.

Prerequisites: Political Science 47.100 and a 200-level course in Political Science, preferably 47.215 or 47.260.

Lectures and discussion three hours a week.

Political Science 47.312

Government and Politics of East Asia

The evolution and functioning of the political systems of China, Japan and Korea.

Prerequisites: Political Science 47.100 and a 200-level course in Political Science, preferably 47.215.

Lectures and discussion three hours a week.

Political Science 47.313★

Women in Politics: A Comparative Perspective

An examination of the participation of women in politics, especially in developed democracies. Special emphasis is placed on the structural and cultural impediments to full participation, in the Canadian context, using primary data.

Prerequisites: Political Science 47.100 and one of 47.200, 47.201, 47.215 or 47.270.

Lectures and discussion three hours a week.

Political Science 47.314

Politics In Central and Eastern Europe

A comparative examination of political institutions and processes in the Communist states of Central and Eastern Europe.

Prerequisites: Political Science 47.100 and a 200-level course in Political Science, preferably 47.215.

Lectures and discussion three hours a week.

Political Science 47.315

Government and Politics of South and South-East Asia

This course on developing areas acquaints the student with the patterns of colonial history, emergent political regimes and problems of development and foreign policy in the countries from Pakistan through the Philippine Islands, with special emphasis on problems of political change.

Prerequisites: Political Science 47.100 and a 200-level course in Political Science, preferably 47.215.

Lectures and discussion three hours a week.

Political Science 47.316★

Revolution

An examination of theories of revolution from Aristotle through the present era. Students are encouraged to examine revolution as a concept, and as an empirical fact of central importance to our age.

Prerequisite: Political Science 47.215.

Lectures and discussion three hours a week.

Political Science 47.317★

The Causes of War

A detailed examination of alternate theories of the causes of war. The course examines such alternate perspectives as biological, social and comparative historical approaches, and includes the results of peace research activities of the past two decades.

Prerequisite: Political Science 47.215.

Lectures and discussion three hours a week.

Political Science 47.318★**Women in Developing Politics: A Comparative Assessment**

This course examines the status and role of women in developing countries and in socialist countries mobilized for social change, including case studies drawn from Africa, Asia and Latin America. It includes an examination of aspects of development theories from a feminist perspective.

Prerequisite: Political Science 47.215.

Lectures and discussion three hours a week.

Political Science 47.320**Soviet Government and Politics**

A study of the environment and political culture of the Soviet political system; political socialization, communication and elite recruitment; the structure and functioning of the Communist Party and governmental institutions; policy making and implementation, capabilities of the Soviet political system.

Prerequisites: Political Science 47.100 and a 200-level course in Political Science, preferably 47.215, or History 24.260.

Lectures and discussion three hours a week.

Political Science 47.321**Government and Politics of Western Europe**

A survey of the political processes and institutions in the democracies of Western Europe, with emphasis on Britain, France, Italy and the German Federal Republic.

Prerequisites: Political Science 47.100 and a 200-level course in Political Science, preferably 47.215.

Lectures and discussion three hours a week.

Political Science 47.322**Government and Politics of the United States**

American political thought, constitutional development, and the governmental process.

Prerequisites: Political Science 47.100 and a 200-level course in Political Science, preferably 47.215.

Lectures and discussion three hours a week.

Political Science 47.330★**Politics and Literature**

A study of imaginative prose in which political ideas and/or political settings dominate. Literature as political communication, the impact of literature upon politics, the peculiar value of literature in the study of politics, its shortcomings.

Prerequisites: Political Science 47.100 and a 200-level course in Political Science, preferably 47.230.

Lectures and discussion three hours a week.

Political Science 47.331★**Politics and Psychoanalytic Thought**

An investigation and critique of the contribution of psychoanalytic thought to political and social theory. Emphasis is placed on the origin and function of culture, instinct modification, perversion, character and political order; the psychoanalytic ethic and the therapeutic state; the Freudian-Marxist dialectic and the critique of society.

Prerequisite: Political Science 47.230 or Psychology 49.261.

Lectures and discussion three hours a week.

Political Science 47.332★**East Asian Political Thought—China, Japan and Korea**

A seminar on Chinese political philosophy with special reference to historical and modern thought on the State. Japanese and Korean variants of the Chinese state are also discussed.

Prerequisites: Political Science 47.100 and a 200-level course in Political Science, preferably either 47.215 or 47.230.

Lectures and discussion three hours a week.

Political Science 47.333**Modern Political Thought and Ideologies**

An analysis of leading political concepts and ideologies since 1800, including utilitarianism, liberalism, conservatism, socialism and fascism.

Prerequisite: Political Science 47.230.

Lectures and discussion three hours a week.

Political Science 47.334**Ancient and Medieval Political Thought**

An inquiry into the significance for political theory of the ancient and medieval controversies over nature/convention, power/knowledge, time/eternity, theory/practice, and science/mysticism. Such thinkers as Homer, the pre-Socratics, Plato and Aristotle, the neo-Platonists, Augustine, and the Scholastics are considered.

Prerequisite: Political Science 47.230 or Philosophy 32.225 or Law 51.315.

Lectures and discussion three hours a week.

Political Science 47.335★**Canadian Political Ideas**

An examination of the sources and development of political ideas in French and English Canada.

Prerequisite: Political Science 47.200 (or 47.201), or 47.230 (preferably both).

Lectures and discussion three hours a week.

Political Science 47.336★**Canadian Political Culture**

An analysis of the elements of Canadian political culture. Topics include individual beliefs, attitudes and values, the influence of the economy and environment, ideology, political socialization, and regional differences.

Prerequisite: Political Science 47.200 or 47.201.

Lectures and discussion three hours a week.

Political Science 47.340**Canadian Public Administration**

A survey of the political and social impact of the federal public service in Canada, including the nature of bureaucracy, its role in policy making, and social and political control of the public service in Canada.

Prerequisite: Political Science 47.200 or 47.201.

Lectures and discussion three hours a week.

Political Science 47.345★**Comparative Public Policy Analysis**

An examination of the formation and impact of public policy including such topics as policy directed at citizens, policies directed at corporations and policies directed toward government itself. Students have an opportunity to consider a variety of political systems as well as a variety of policy areas. Emphasis is placed on developing skills for the analysis of policy formation and impact.

Prerequisites: Political Science 47.100 and either 27.230 or 47.270.

Lectures and discussion three hours a week.

Political Science 47.360★**International Institutions**

Origins, structure and functioning of international institutions with emphasis on the United Nations as well as regional organizations. Topics include peace and security, international aid and development, human rights and the control of global resources.

Prerequisite: Political Science 47.260.
Lectures and discussion three hours a week.

Political Science 47.361★
Theories of International Politics

A survey of theoretical approaches to the study of international politics including an examination of the major concepts used for analysis and explanation in the field.
Prerequisite: Political Science 47.260.
Lectures and discussion three hours a week.

Political Science 47.362★
International Politics of the Middle East

A survey of contemporary diplomatic and security issues in the Middle East region, including the impact of the West, the role of Islam, inter-Arab relations, the Arab-Palestinian-Israeli conflict, the Iran-Iraq war, the role of the great powers, and Canadian Middle East policy.
Prerequisite: Political Science 47.260.
Lectures and discussion three hours a week.

Political Science 47.365★
Comparative Study of Foreign Policy

An examination of the utility of comparative analysis in the study of the objectives, strategies and decision-making processes involved in the foreign policies of states.
Prerequisite: Political Science 47.260.
Lectures and discussion three hours a week.

Political Science 47.366★
Canadian Foreign Policy

An examination of the traditions, domestic influences, objectives, capabilities, and decision-making processes, and analysis of selected contemporary issues.
Prerequisite: Political Science 47.260.
Lectures and discussion three hours a week.

Political Science 47.367★
Canadian Defence Policy

The evolution of Canadian defence policy in the twentieth century. The course addresses both the theory of Canadian defence policy and its operational aspects in a broad comparative context, related to themes such as strategic theory, military culture in a modern state, continentalism and military alliances.
Prerequisite: Political Science 47.200, 47.201, or 47.260.
Lectures and discussion three hours a week.

Political Science 47.390
Etudes dirigées

Un programme de lectures choisies et de travaux écrits dans le domaine de spécialisation d'un membre du département. Consulter le conseiller des études de premier cycle (Undergraduate supervisor) pour les sujets offerts.
Prerequisite: Third-year standing in the Political Science
Mention: français program.

• **Fourth Year: Honours and Graduate**

These courses are normally reserved for Honours students in their final year.

Political Science 47.400
Topics in Canadian Government and Politics

Section A: Political Economy of Canada. An examination of selected issues in Canadian political economy including the role of the state in the Canadian economy, the political aspects of foreign ownership and economic structure and political change.

Section B: Canadian Political Institutions. A seminar on selected topics on institutions of Canadian Government at

the federal level.

Section C: Canadian Political Behaviour. A seminar on voting, public opinion, political violence, socialization and other aspects of political behaviour in Canada. The course also examines religion, class and region as determinants of political cleavage.

Prerequisite: Political Science 47.200 or 47.201.
Seminars three hours a week.

Political Science 47.401
Canadian Public Policy

A seminar that critically examines relevant policy patterns, structures and processes from a number of theoretical perspectives, in relation to the Canadian political economy and to selected areas of contemporary Canadian public policy (such as energy, social welfare, foreign investment, public expenditure and regulation).

Prerequisites: For B.P.A. students, Political Science 47.200 or 47.201 and 47.340. For Honours Political Science students, Political Science 47.200 or 47.201 and an additional course in Canadian government or public administration/public policy above the 200 level.
Seminar three hours a week.

Political Science 47.402★

Policy Seminar: Problems of Northern Development

A research seminar that examines the issues, the policy processes and the problems of policy implementation in the political and economic development of Canada's northern territories.

Prerequisites: Political Science 47.200 or 47.201 and 47.340.

Seminar three hours a week.

Political Science 47.403★
Politics and the Media

A seminar on the role of the mass media in the Canadian political system from a comparative perspective.
Prerequisite: Political Science 47.200 or 47.201.
Seminar three hours a week.

Political Science 47.405
Federalism

A seminar on the theory and practice of divided political authority. The primary focus is the Canadian federal structure and its current crisis. Using a theme-oriented approach, the methodology is comparative, with relevant aspects drawn from the experience of other federations and quasi-federations.

Prerequisite: Political Science 47.200 or 47.201.
Seminar three hours a week.

Political Science 47.406★
Legislative Process in Canada

A seminar on the role of Parliament and of the individual M.P. in terms of policy making, representation and the passage of legislation.

Prerequisite: Political Science 47.200 or 47.201.
Seminar three hours a week.

Political Science 47.407★
The Politics of Law Enforcement in Canada

A research seminar focusing on major issues in the area of law enforcement policy, police administration and the criminal justice system in Canada. Particular emphasis is given to the role of law-enforcement agencies as integral institutions of the Canadian political system.

Prerequisite: Political Science 47.200 or 47.201. Prerequisite may be waived for students with practical experience in law enforcement.
Seminar three hours a week.

Political Science 47.408★**National Security and Intelligence in the Modern State**

A research seminar dealing with the state's response to foreign espionage, alleged subversion, terrorism, and counterintelligence in general but with specific reference to the dilemmas of national security operations in liberal societies. Major focus is on the Canadian experience, but with extensive use of materials chronicling the practices of KGB, CIA, BIS, ASIO, MOSSAD, etc.

Prerequisite: Political Science 47.200, 47.201, or 47.260.

Seminar three hours a week.

Political Science 47.409★**Politics in Quebec**

An examination of society, culture, economy and politics in Quebec, giving special attention to the politically relevant changes since 1960 and the central place of Quebec within the Canadian federation.

Prerequisites: Political Science 47.200 and a reading knowledge of French or 47.201.

Seminar three hours a week.

Political Science 47.410★**Canadian and Comparative Local Government and Politics**

The seminar begins with a comparative survey of the systems of local government in Canada, Britain and the United States, and in the remainder of the course the emphasis on Canadian or comparative, and the problems chosen for study, varies with the interests of the students.

Prerequisite: One of Political Science 47.200, 47.201, or 47.215, and preferably one of 47.302★ or 47.303★.

Seminar three hours a week.

Political Science 47.411★**French-English Relations**

A seminar on French-English relations in federal politics and in selected provinces, with emphasis on areas of conflict and methods of conflict management.

Prerequisites: Political Science 47.200 or 47.201 or an approved course in Canadian history. A reading knowledge of French is recommended.

Seminar three hours a week.

Political Science 47.412★**Politics of Western Liberal Democracies**

A seminar that examines the social structure and politics of advanced capitalist societies, including the historical and contemporary relationship between social classes — groupings, political parties and interest groups.

Prerequisite: Political Science 47.200, 47.201, or 47.215.

Seminar three hours a week.

Political Science 47.413★**The State in Advanced Capitalist Societies**

A seminar that undertakes comparative analysis of the structure and role of the state in capitalist societies. Specific topics may include state economic intervention, corporatism, welfare state activities and neo-conservatism.

Prerequisite: Political Science 47.200, 47.201, or 47.215.

Seminar three hours a week.

Political Science 47.414★**Theory and Practice in Third-World Development**

An examination of the various theoretical approaches to the analysis of development and underdevelopment, of the historical experience of important models of development and of their application to selected countries in Asia, Africa and Latin America.

Prerequisite: Political Science 47.215, 47.260, 47.310,

47.312 or 47.315.

Seminar three hours a week.

Political Science 47.415★**Selected Problems in Third-World Development**

A research seminar focusing on the nature of international factors that influence Third World development such as multinational corporations, the new international division of labour, the new protectionism, the role of international debt, the politics of the Green Revolution, technology, and development assistance.

Prerequisites: Political Science 47.215, 47.260, 47.310, 47.312 or 47.315; and 47.414★.

Seminar three hours a week.

Political Science 47.416★**Labour and the Canadian State**

A comparative examination of models of labour and the liberal democratic state, which pays particular attention to the role of the Canadian labour movement in the political process.

Prerequisite: Political Science 47.200 or 47.201.

Seminar three hours a week.

Political Science 47.417★**Political Participation in Canada**

A seminar on the causes and implications of political participation by individuals with special reference to Canada. Topics include citizen participation in campaign and party organizations, political protest movements, interest groups, and community associations.

Prerequisites: Political Science 47.200 or 47.201, and 47.270.

Seminar three hours a week.

Political Science 47.420★**Policy Making in the United States**

A seminar on conflict and co-operation in the United States legislative and executive/bureaucratic arenas; this course also treats overlapping struggles over policy initiative, innovation and planning. Special emphases are determined by student needs and interests.

Prerequisites: Political Science 47.100 and 47.322.

Seminar three hours a week.

Political Science 47.421★**Politics of Influence in the United States**

A seminar on parties, interest groups, coalitions, movements and other significant influences upon who gets what, when, how in the United States. Other topics include elections, democratic accountability and political uses of mass media. Special emphases are determined by student needs and interests.

Prerequisites: Political Science 47.100 and 47.322.

Seminar three hours a week.

Political Science 47.422★**Constitutional Politics**

A seminar on the political character of leading western constitutions, with special emphasis on judicial politics and judicial policy-making in the United States; consideration is also given to developments in Canada, Britain and France.

Prerequisites: Political Science 47.100 and 47.322.

Seminar three hours a week.

Political Science 47.430★**Concepts of the State**

A critical survey of concepts of the state from Hegel to the present with emphasis on the dichotomy between the political and civil society, as well as on an analysis of class nature and regulatory role of the state in modern societies.

Prerequisite: Political Science 47.230 or 47.333.
Seminar three hours a week.

Political Science 47.431★

Marxist Thought

An examination of Marxism with special emphasis on Marx and Engels, and including writings from all periods of their work.

Prerequisite: Political Science 47.230 or 47.333.
Seminar three hours a week.

Political Science 47.432★

Contemporary Marxism

An examination of all relevant interpretations of Marx's theory including evolutionary socialism, Leninism, Trotskyism, Stalinism, Maoism and the main schools of contemporary revisionism.

Prerequisite: Political Science 47.431★.
Seminar three hours a week.

Political Science 47.434

Political Inquiry

A study of competing theoretical methods of inquiry in the discipline — positivism, functionalism, phenomenology, structuralism, and post-structuralism — with particular attention to the claims made for scientific truth. Weber, Polanyi, Feyerabend, Kuhn, Habermas, Foucault, Rorty and others are considered.

Prerequisite: Political Science 47.230 or 47.270.
Seminar three hours a week.

Political Science 47.435

Contemporary Political Theory

Recent work in political theory, stressing major approaches to the understanding of contemporary political life. This seminar includes approaches such as historicism, the sociology of knowledge, positivism, phenomenology, critical theory, existentialism, neo-classicism. Works by such thinkers as Gramsci, Mannheim, Popper, Strauss, Cassirer, Habermas, Sartre, and Voegelin are discussed.

Prerequisite: Political Science 47.230.
Seminar three hours a week.

Political Science 47.440★

Comparative Public Administration

A comparative study of the historical evolution of administration in Western Europe under absolute monarchy; the interaction of democracy and bureaucracy in Europe and North America; the transplanting of British and French bureaucratic institutions in colonial regimes and elsewhere; and the significance of bureaucracy in developed and developing societies.

Prerequisite: Political Science 47.215 or 47.340.
Seminar three hours a week.

Political Science 47.441★

Business-Government Relations in Canada

A seminar on the theory and practice of business-government relations in Canada. The primary focus is on the role of the private sector firm in the Canadian political system and policy process, with case studies addressing issues and problems in the relations of business to government.

Prerequisite: Political Science 47.200, 47.201, or Business 42.361★.

Seminar three hours a week.

Political Science 47.446★

Theories of Public Administration

A seminar on the theories of bureaucracy, organization and comparison.

Prerequisite: Political Science 47.340.
Seminar three hours a week.

Political Science 47.447★

Decision Theories and Policy Studies

This course covers decision making and policy studies in a non-mathematical way from three complementary angles: basic philosophy, psychology and theory of individual and group decision making, and overall policy analysis as pursued by Vickers, Dror and others, with a brief look at tools of decision making.

Prerequisite: Political Science 47.340.
Seminar three hours a week.

Political Science 47.448

Public Organizations: Theory and Practice

An examination of the major schools of organizational theory and behaviour as approaches for understanding the nature of public organizations. In the Winter term students prepare research papers on particular public agencies.

Prerequisite: Political Science 47.340.
Seminar three hours a week.

Political Science 47.460

Analysis of International Politics

Some principal issues in international relations; theory building, evaluation of concepts, research design, philosophy of science criteria and policy relevance in ongoing research in international relations theory.

Prerequisite: Political Science 47.260.
Seminar three hours a week.

Political Science 47.461★

Soviet Foreign Policy

An examination of the foreign policy of the Soviet Union, with special emphasis on trends since World War II and on the period of détente.

Prerequisites: Political Science 47.260 and 47.320.
Seminar three hours a week.

Political Science 47.463★

Analysis of International Political Economy

A seminar on the various theoretical approaches to the study of the international political economy, with a focus on historical development and changing international structures.

Prerequisites: Political Science 47.260 or two of 47.360★, 47.361★, 47.362★, 47.365★, and 47.366★.
Seminar three hours a week.

Political Science 47.464★

Selected Problems in International Political Economy

A seminar that focuses on contemporary problems and issues in the international political economy, with particular attention given to advanced industrial countries.

Prerequisite: Political Science 47.463★.
Seminar three hours a week.

Political Science 47.466★

American Foreign Policy

A seminar on sources, trends and conflicting interpretations of the international roles of the United States since World War II. Foreign policy machinery and processes are assessed in terms of the relative importance of perceptions, ideology, self-interest, and domestic and foreign pressures. Special emphases are determined by the needs and interests of students.

Prerequisite: Political Science 47.260.
Seminar three hours a week.

Political Science 47.467★**International Politics of North America**

An examination of continentalism within Canadian foreign policy during the twentieth century in relation to Britain and the United States.

Prerequisite: Political Science 47.260.

Seminar three hours a week.

Political Science 47.471★**Intermediate Polimetrics for Micro Data**

This course introduces students to research designs and statistical techniques primarily used in analyzing survey data. Selected topics may vary from year to year. Students doing Honours papers based on micro data are advised to take this course.

Prerequisite: Political Science 47.270.

Seminar three hours a week.

Political Science 47.472★**Intermediate Polimetrics for Macro Data**

This course introduces students to research designs and statistical techniques primarily used in analyzing macro or aggregate data. Selected topics may vary from year to year. Students doing Honours papers based on macro data are advised to take this course.

Prerequisite: Political Science 47.270.

Seminar three hours a week.

Political Science 47.482★**International Politics of Africa**

The interactions of African states within the African subsystem and with other sectors in the international system. Each year the seminar focuses on a particular theme.

Prerequisite: Political Science 47.260 or 47.310.

Seminar three hours a week.

Political Science 47.483★**Foreign Policies of Major East Asian Powers**

The foreign policies of the East Asian powers, with special attention to China and Japan; an analysis of the domestic sources of policy, capabilities, interests, decision-making processes and foreign relations.

Prerequisite: Political Science 47.260 or 47.312.

Seminar three hours a week.

Political Science 47.484★**International Relations of South and Southeast Asia**

A seminar on the foreign policy orientations of the regional actors and interaction with non-regional actors. Special emphasis is given to enduring sources of conflict within the area, and emerging patterns of co-operation, including comparison of ASEAN with SAARC.

Prerequisite: Political Science 47.260 or 47.315.

Seminar three hours a week.

Political Science 47.490**Tutorial In a Selected Field**

Tutorials or reading courses on selected topics may be arranged with the permission of the Department and agreement of the instructor.

Day division: Tutorial hours arranged.

Political Science 47.491★**Tutorial In a Selected Field**

Tutorials or reading courses on selected topics may be arranged with the permission of the Department and agreement of the instructor.

Day division, Fall term: Tutorial hours arranged.

Political Science 47.492★**Tutorial In a Selected Field**

Tutorials or reading courses on selected topics may be arranged with the permission of the Department and agreement of the instructor.

Day division, Winter term: Tutorial hours arranged.

Political Science 47.498**Honours Graduation Essay**

During their Fourth year, Honours candidates in Political Science are required to present a major research essay. The Honours essay is carried out under the direction of a faculty supervisor who is either selected by the candidate or assigned early in the year. The Honours essay is evaluated by both the supervisor and an appointed reader. Prerequisite: Final-year Honours standing in Political Science.*

Day division: Tutorial hours arranged.

*Students should refer to regulations of the Faculty of Social Sciences regarding submission of Honours Essays (see p.61) and to the Department of Political Science course requirements for the Honours Essay, which may be obtained from the Departmental Office.

Political Science 47.499**Mémoire de recherche**

Un travail de recherche dans le domaine de spécialisation d'un membre du département. Consulter le conseiller des études de premier cycle (Undergraduate supervisor) pour les sujets offerts.

Prerequisites: Fourth-year standing in the Political Science "Mention: français" program.

• Graduate Courses

Fourth-year Honours students may, with permission of the Department, be admitted to the following 500-level Political Science seminars, which are more fully described in the Graduate Studies and Research Calendar:

Political Science

- 47.501★ Canadian Provincial Government and Politics
- 47.503★ Political Parties in Canada
- 47.504★ Policy-Making in Canada
- 47.506★ Problems of Canadian Government I
- 47.507★ Problems of Canadian Government II
- 47.508★ The Politics of Energy and the Environment
- 47.509★ Canadian Political Economy
- 47.511★ Canadian Federalism
- 47.514★ Comparative Communist Politics, Theory and Practice
- 47.515★ Comparative Communist Politics, Selected Aspects
- 47.516★ Selected Problems in Soviet Politics
- 47.517★ Selected Problems in African Politics
- 47.518★ State, Revolution, and Reform in East Asia
- 47.519★ Comparative Public Policy
- 47.520★ Nationalism
- 47.521★ Politics in Plural Societies
- 47.522★ Politics of Third-World Development
- 47.525★ Problems in American Government I
- 47.526★ Problems in American Government II
- 47.531★ Modern Political Culture and Ideology
- 47.532★ Democratic Theories
- 47.536★ The Canadian and American Political Traditions I
- 47.537★ The Canadian and American Political Traditions II
- 47.541★ Canadian Public Administration and Policy Analysis

- 47.544★ Public Administration in Developed Western Countries
- 47.545★ Public Administration in Developing Countries
- 47.548★ Research Seminar in Public Administration I
- 47.549★ Research Seminar in Public Administration II
- 47.551★ Selected Issues in Political Economy I
- 47.552★ Selected Issues in Political Economy II
- 47.553★ Selected Problems in Western European Politics I
- 47.554★ Selected Problems in Western European Politics II
- 47.555★ Selected Problems of Comparative Politics I
- 47.556★ Selected Problems of Comparative Politics II
- 47.561★ Analysis of Canadian Foreign Policy
- 47.573★ Advanced Research Methods
- 47.581★ Foreign Policies of African States
- 47.585★ Foreign Policy Analysis
- 47.586★ Strategy
- 47.587★ Analysis of International Organization
- 47.588★ International Political Economy
- 47.589★ Problems in International Politics

Related Courses

Subject to *prior* approval by the Department, a student in the Honours or Pass program may use one course in a related discipline as a Political Science credit. This permission will be granted only if the content of the transfer course is very closely related to Political Science and if the Department of Political Science does not itself offer a comparable course. Students in the Combined Pass or Honours programs may not use related courses as Political Science credits.

Courses Planned for Summer School and Evening Division

A selection of courses will normally be offered in both Day and Evening divisions in the Summer. In the Fall/Winter session Political Science 47.100, 47.200, 47.230, 47.260, and 47.270 will normally be offered in both Day and Evening divisions. In addition, a number of 300- and 400-level courses will be scheduled in the Evening division each year. Specific course offerings will depend on faculty availability and student interest and demand.

Loeb Building, Room B550
Telephone: 788-2644

Officers of Instruction

Chairman

W.D. Jones

Chairman, Graduate Committee

R. Hoffmann

Chairman, Undergraduate Committee

J.F. Campbell

Professors

D.A. Andrews
H. Anisman
R.F. Dillon
H.B. Ferguson
P.A. Fried
R. Hoge
W.D. Jones
J.B. Kelly
R.M. Knights
M.E. Marshall
D.C. McIntyre
B.A. Pappas
J. Partington
W.M. Petrusic
T.J. Ryan
N. Spanos
L.H. Strickland
W. Thorngate
J. Tombaugh
T.N. Tombaugh
W.G. Webster
D.W. Zimmerman

Associate Professors

D.K. Bernhard
E.J. Burwell
J.F. Campbell
F. Cherry
R.F. Hoffmann
L. Kristianson
B. Little
A. Moffitt
S. Painter
D.C.S. Roberts
B.W. Tansley
W.E. Walther
R.B. Wells
R. Zacharko

Assistant Professors

T. Daniels-Beirness
M. Gick
C. Herdman
J. Lefevre
J. Murray
L. Paquet
S. Parlow

Adjunct Professors

A. Blouin, *Civic Hospital*
J. Bonta, *Ottawa-Carleton Detention Centre*
D.C. Buchanan, *Royal Ottawa Regional Rehabilitation Centre*

J. D'Eon, *Royal Ottawa Regional Rehabilitation Centre*

H.B. Ferguson, *Royal Ottawa Hospital*

P. Firestone, *University of Ottawa*

S.G. Gilbert, *Health and Welfare, Canada*

J. Goodman, *Children's Hospital of Eastern Ontario*

Z. Jacobson, *Supply and Services, Canada*

A.B. Laver, *Carleton University*

F. Porporino, *Correctional Services, Canada*

B. Shelton, *Bell Northern Research*

C.T. Smith, *Trent University*

L.B. Stelmach, *Department of Communication*

T. Whalen, *Department of Communications*

C.P. Whaley, *Bell Northern Research*

S.J. Wormith, *Rideau Correctional and Treatment Centre*

Study in Psychology

The Department of Psychology offers two programs in the Faculty of Social Sciences. One leads to a Bachelor of Arts (B.A.) degree with Honours in Psychology; the other leads to a B.A. degree in Psychology and is referred to as a Pass degree in Psychology. In the Faculty of Science, the Department offers a program leading to a Bachelor of Science (B.Sc.) degree with Honours in Psychology.

With certain restrictions, these degree programs may be combined with programs in other departments. In addition, the B.A. Honours and B.A. Pass programs in Psychology may be undertaken with concentration in Criminology and Criminal Justice. (p. 102).

To be eligible to enter, to continue and to graduate from these degree programs, students must fulfil all the University regulations (see pp. 38-39) and all appropriate Faculty regulations (see pp. 65-66 for the Faculty of Social Sciences and pp. 349-350 for the Faculty of Science). In addition students must meet the requirements of the Department of Psychology, as described below for the B.A. programs and on p. 413 for the B.Sc. program.

Course Organization in Psychology

Study in Psychology begins with Introductory Psychology (Psychology 49.100), which is a prerequisite for all other courses offered by the Department. At the Second-year level, the Department offers a set of core courses, each of which presents basic content in an area of psychology. These courses, which are frequently prerequisites for higher level courses, are numbered 49.210★, 49.220★, 49.230★, 49.250★, 49.260★, and 49.270★. Some combination of these core courses is required in each of the programs of study offered by the Department of Psychology.

Included among the second-level courses is Psychology 49.200, Introduction to Psychological Research and Statistics, which must be completed by all students enrolled in a departmental program.

The second-level courses lead to branching courses, which offer still further specialization in the subject matter of psychology. These and other advanced courses are usually numbered at the 300 and 400 level. The upper-level courses in psychology are loosely clustered into speciality areas, which may be used to focus study within degree programs. The speciality areas are identified by the next-to-last digit of the course number: Social Psychology (49.x1x), Neuroscience (49.x2x), History (49.x3x), Community (49.x4x), Developmental (49.x5x), Personality (49.x6x), Learning and Cognition (49.x7x), Testing and Assessment (49.x8x).

Courses Outside the Department of Psychology

Credits for the degree that are not specified by the Department of Psychology may be taken in any discipline, subject to the Faculty of Social Sciences regulations described on pp. 60-65. Unspecified credits may also be taken in Psychology so long as the maximum number of Psychology credits permitted for the degree is not exceeded.

Students are strongly urged to discuss the suitability of their course selections with the Undergraduate Office of the Department of Psychology.

B.A. with Honours Program

The B.A. Honours program requires 20 course credits, with a minimum of 9 and a maximum of 12 of these taken in Psychology. This program normally takes four years to complete, but may take longer.

One feature of the Honours program is a required seminar course, which is normally taken in the Third year of study. The Department of Psychology offers seven Honours seminars (Psychology 49.310, 49.320, 49.340, 49.350, 49.360, 49.370, and 49.380).

Other features of the Honours program are the required courses, Psychology 49.300, Design and Analysis in Psychological Research (or an acceptable equivalent), and 49.498, Thesis for Honours in Psychology.

Students in part-time study should note that the times when Honours courses are offered may require enrolment during the Day division.

To enter the B.A. Honours program, a student should make application at the Faculty Registrar's Office as soon as possible after completion of the introductory course (Psychology 49.100) and before the end of the Second program year (or before the completion of ten course credits). The periods during the academic year when application may be made are announced by the Faculty Registrar. Students who apply after their Second year may have difficulty completing all course requirements within the next two years.

Entry to and continuation in years Two and Three of the B.A. Honours program in Psychology, as well as permission to take Honours courses in Psychology, requires a grade-point average of 6.0 or better over all graded Psychology courses taken at Carleton University. Entry to year Four requires a grade-point average of 6.5 or better over all graded Psychology courses taken at Carleton University. Failure to maintain the minimum required grade-point average will result in a student being required to withdraw from the Honours program in Psychology.

In addition, to enter and to continue in the B.A. Honours program, a student must meet the relevant Faculty of Social Sciences regulations, which are found on pp. 60-65.

Graduation from the B.A. Honours program in Psychology requires a grade-point average of 6.5 or better over all graded Psychology courses counted towards the degree.

A student in the B.A. Honours program may apply to transfer to the Pass program at the times specified by the Faculty Registrar and may be graduated with a B.A. degree provided that the requirements for that degree have been satisfied.

The Department's requirements for this degree are:

1. Psychology 49.100;

2. Psychology 49.200;

3. Psychology 49.210★, 49.220★, 49.230★, 49.250★, 49.260★, 49.270★;

4. Psychology 49.300;

5. One of Psychology 49.310, 49.320, 49.340, 49.350, 49.360, 49.370, or 49.380;

6. Psychology 49.498;

7. One additional credit in Psychology (Computer Science 95.101★ may be offered as an optional half credit in Psychology but only with permission of the Department of Psychology obtained prior to enrolment);

8. One credit or two half credits in a discipline or interdisciplinary area outside the Faculty of Social Sciences;

9. One credit or two half credits in a second discipline or interdisciplinary area outside the Faculty of Social Sciences.

B.A. with Combined Honours in Psychology and Another Discipline

Other than as described below for specific disciplines, the Department's requirements for the B.A. degree with Honours in Psychology and another discipline are, with one exception, the same as those for the degree with Honours in Psychology alone. The optional credit in Psychology (Requirement 7) is waived so that a student in a Combined program is only required to take a minimum total of eight credits in Psychology. The maximum number of Psychology credits allowed in any combined Honours program is 12.

When application is made to enter a Combined Honours program in Psychology and another discipline, the student must declare one of the disciplines as the discipline of primary study. For programs involving the following disciplines, if Psychology is not the discipline of primary study, the Psychology requirements for the Combined program are modified as stated.

Combined Honours in Psychology and Biology, Economics, or Law

If Biology, Economics, or Law is the discipline of primary study, the student must replace Psychology 49.498 (Requirement 6) with either Biology 61.498, Economics 43.498, or Law 51.498 respectively. All other Psychology requirements must be met, including Requirement 7. The minimum number of Psychology credits required is eight.

Combined Honours in Psychology and Mass Communication

If Mass Communication is the discipline of primary study, the student may replace Psychology 49.200 (Requirement 2) with Mass Communication 27.201. The student should replace Psychology 49.300 (Requirement 4) with Mass Communication 27.401. The student must replace Psychology 49.498 (Requirement 6) with Mass Communication 27.497. All other requirements of the Department of Psychology must be met, including Requirement 7. The minimum number of Psychology credits required is seven. Additional optional credit in Psychology may be necessary to meet the minimum number required.

Combined Honours in Psychology and Sociology

If Sociology is the discipline of primary study, then Psychology 49.200 (Requirement 2) may be replaced with Sociology 53.203. The student must replace Psychology 49.300 and 49.498 (Requirements 4 and 6) with Sociology 53.370, and 53.495/54.495 or 53.498, respectively. All other re-

quirements of the Department of Psychology must be met, including Requirement 7. The minimum number of Psychology credits required is seven. Additional optional credit in Psychology may be necessary to meet the minimum number required.

Combined Honours in Psychology and Anthropology

The requirements for a Combined Honours program in Psychology and Anthropology are as stated for programs combining unspecified disciplines.

B.Sc. with Honours Program

The program leading to the B.Sc. degree with Honours in Psychology is described in the entry for the Department of Psychology under the Faculty of Science (p. 413). In general, the requirements of the Department of Psychology for the B.Sc. degree with Honours are the same as for the B.A. degree with Honours. The required and optional credits, however, are strictly specified. Students should consult the Undergraduate Office of the Department of Psychology for advice concerning the B.Sc. program.

Pass Program

The Pass program is intended for those students who want to have Psychology as their required area of study in the B.A. program. The B.A. degree requires a total of 15 credits and normally takes three years of study. A minimum of 6 and a maximum of 7 of the credits must be in Psychology.

To major in Psychology a student must make application at the Faculty Registrar's Office as soon as possible after completion of the introductory course (Psychology 49.100) and before the end of the Second program year (or completion of 10 course credits). The periods during the academic year when application may be made are announced by the Faculty Registrar.

The requirements for the degree may be met in part-time study.

Entry to and continuation as a Pass student in Psychology as well as graduation with the B.A. degree require that the student maintain a grade-point average of at least 4.0 over all Psychology courses taken at Carleton University.

The student must meet all the relevant University and Faculty of Social Sciences regulations. The University regulations are given on pp. 38-39, and those of the Faculty of Social Sciences on pp. 65-66.

The Department's requirements for this degree are:

1. Psychology 49.100;
2. Psychology 49.200;
3. Four of Psychology 49.210★, 49.220★, 49.230★, 49.250★, 49.260★, or 49.270★ with the constraint that at least one of these be either Psychology 49.220★ or 49.270★;
4. Two additional credits in Psychology (Computer Science 95.101★ may be offered as an optional half credit in Psychology, but only with permission of the Department of Psychology obtained prior to enrolment);
5. One credit or two half credits in a discipline or interdisciplinary area outside the Faculty of Social Sciences;
6. One credit or two half credits in a second discipline or

interdisciplinary area outside the Faculty of Social Sciences.

Combined Pass Program in Psychology and Another Discipline

The Department's requirements for a Pass program combining study in Psychology with another discipline are the same as for study in Psychology alone, with the exception that for Requirement 4, only one additional Psychology credit, not two, is required. The minimum number of required credits in Psychology is five and the maximum number that may be counted toward the degree is seven.

Students combining study in Psychology and Mass Communication may replace Psychology 49.200 (Requirement 2) with Mass Communication 27.201. Similarly, students combining study in Psychology and Sociology may replace Psychology 49.200 with Sociology 53.203. In these cases, students must take an additional, optional credit in Psychology, for a minimum total of five credits in Psychology. For students combining study in Psychology and Anthropology the requirements are as for study in Psychology alone, but only one optional credit in Psychology (Requirement 4) is required.

Departmental Advice

The Department of Psychology maintains an Undergraduate Office, which operates daily from Monday to Thursday. There students will find advice about Psychology programs, course selections and program changes. Faculty and staff are available for discussion of career options and courses of study. The office is located in B552, Loeb Building, and may be reached by telephone at 613-788-2644.

In addition, the Department publishes annually a Student Guide, which presents additional details about the requirements of the Department and the courses offered during the year. This guide also contains recommendations about the sequences in which courses should be taken. A copy of the guide is available on request at the Undergraduate Office.

Graduate Program

The Department of Psychology offers studies leading to the degree of Master of Arts (M.A.) and to the Doctor of Philosophy (Ph.D.) degree. For details of these programs consult the Department and the Calendar of the Faculty of Graduate Studies and Research.

Courses Offered

Note:

Students should consult the class schedule for those courses to be offered in the session and term for which they wish to register.

Psychology 49.100

Introductory Psychology

The course provides a foundation for the scientific understanding of human and animal behaviour. Both biological and social science approaches are considered.

Lecture three hours a week.

Psychology 49.200

Introduction to Psychological Research and Statistics

An introduction to the various research methodologies and statistical ideas employed within contemporary psychology. Topics covered typically include experimental, observational, case study and archival techniques. The data analysis and inferential techniques are presented at a level emphasizing the elementary logical foundations of measurement, data description, inference, and hypothesis testing. Throughout, the course emphasizes basic principles rather than techniques, although both are covered. Prerequisite: Psychology 49.100. Lectures and tutorial four hours a week.

Psychology 49.210★

Introduction to Social Psychology

Introduction to contemporary theory and research in social psychology. Areas covered include attitude structure and change, small groups and social learning.

Note: Students who wish to substitute Sociology 53.210 for Psychology 49.210★ should consult the Undergraduate Office of the Department of Psychology. Students may not offer both Sociology 53.210 and Psychology 49.210★ for credit.

Prerequisite: Psychology 49.100.

Lecture three hours a week.

Psychology 49.220★

Biological Foundations of Behaviour

A general introduction to the biological basis of behaviour with particular reference to biological mechanisms associated with sensory and perceptual processes, motivation, emotion, learning and cognition.

Prerequisite: Psychology 49.100.

Lecture three hours a week.

Psychology 49.230★

Origins of Modern Psychology

The evolution of psychology from the early seventeenth century to modern times in Europe and North America. Emphasis is on the influence of progress in the sciences and philosophy on speculation about psychological processes in humans and other animals, and on the development of psychology as an independent scientific discipline in the nineteenth and twentieth centuries.

Prerequisite: Psychology 49.100.

Lecture three hours a week.

Psychology 49.250★

Foundations of Developmental Psychology

Basic principles of developmental psychology with a concentration on theories and methods. Emphasis is on the psychology of childhood and adolescence.

Prerequisite: Psychology 49.100.

Lecture three hours a week.

Psychology 49.260★

Introduction to the Study of Personality

An introduction to the study of personality. Consideration of problems, methods and theories.

Prerequisite: Psychology 49.100.

Lecture three hours a week.

Psychology 49.270★

Introduction to Cognitive Psychology

A general introduction to cognitive processes, including a survey of theories, issues, methods and findings. Topics covered may include pattern recognition, attention, im-

agery, learning (animal and human), memory, language, and thinking.

Prerequisite: Psychology 49.100.

Lecture three hours a week.

Psychology 49.300

Design and Analysis in Psychological Research

Techniques in data analysis, probability theory, sampling distribution theory and the ideas and procedures of estimation, classical and Bayesian approaches to hypothesis testing, linear regression and curve fitting, distribution free hypothesis testing, and the analysis of variance methods in experimental design will be covered. Throughout the course, use of the computer for data handling and analysis is stressed and use of available programs such as BMDP and SPSSX is required.

Credit towards Psychology degree requirements cannot be obtained for both Psychology 49.300 and any of the following courses: Sociology 53.370, Mass Communication 27.401 or Economics 43.220.

Prerequisites: Psychology 49.200 (or 49.200★, no longer offered), and permission of the Department. Limited enrolment; intended for Honours students in Psychology.

Lectures and tutorial four hours a week.

Psychology 49.310

Social Psychology (Honours Seminar)

An analysis of historical and contemporary developments in social psychology theory, research and methodology. Students may be required to complete independent research projects.

Prerequisites: Psychology 49.200 (or 49.200★, no longer offered) and 49.210★. Permission of the Department required; limited enrolment; intended for Honours students. Lectures, seminars and tutorials six hours a week.

Psychology 49.311★

Social Problems

An analysis of one or more social problems from the point of view of social psychology. The problems studied vary from year to year and may include war and peace, prejudice and discrimination, gender roles, politics and social change, leisure and quality of working life.

Prerequisite: Psychology 49.210★.

Not offered 1990-91.

Psychology 49.312★

Cognitive Processes in Social Psychology

In-depth coverage of one or more sub-areas of social psychology introduced in Psychology 49.210★. Topics may include attitudes, impression formation, attribution of social causality, decision making, and social judgment.

Prerequisite: Psychology 49.210★.

Lectures and seminars three hours a week.

Psychology 49.313★

Group Processes in Social Psychology

In-depth coverage of one or more sub-areas of social psychology introduced in Psychology 49.210★. Topics may include interaction in the dyad, coalition formation in larger groups, history and theory of small group research, North American, West-European and East-European models of group behaviour, and training groups in industry.

Prerequisite: Psychology 49.210★.

Lectures and seminars three hours a week.

Psychology 49.320

Behavioural Neuroscience (Honours Seminar)

A detailed consideration of biological approaches to the study of behaviour and of research methods used in behavioural neuroscience.

Prerequisites: Psychology 49.200 (or 49.200★, no longer offered) and 49.220★. Permission of the Department required; limited enrolment; intended for Honours students. Lectures, seminars and laboratory tutorials six hours a week.

Psychology 49.321★

Comparative Psychology

An introduction to the development of behavioural capacity from unicellular organisms to man.

Prerequisite: Psychology 49.220★.

Lecture and discussion.

Psychology 49.322★

Sensory Processes

The physiological basis of sensation. Topics include sensory mechanisms, neuropsychological bases of perception and psychological phenomena encountered in the various senses.

Prerequisite: Psychology 49.220★.

Lectures and seminars three hours a week.

Psychology 49.323★

Field Course in Animal Behaviour

Offered in the Department of Biology as Biology 61.365★.

Only those modules dealing with animal behaviour topics may be offered for Psychology credit.

Prerequisite: Permission of the Department.

Psychology 49.324★

Drugs and Behaviour

An introduction to synaptic mechanisms and the arrangements of the transmitter-specific brain systems, followed by a discussion of neuro-pharmacological bases of normal and abnormal behaviour and of the behavioural effects of various classes of psychoactive drugs such as stimulants, tranquilizers, opiates, etc.

Prerequisite: Psychology 49.220★.

Lectures and seminars three hours a week.

Psychology 49.325★

Psychopharmacology and Behavioural Medicine

An examination of the relationship between endogenous neurochemical, hormonal and immunological states and various physiological and behavioural pathologies. The contribution of psychological variables to these pathologies will be assessed.

Prerequisite: Psychology 49.324★ (or 49.327★, no longer offered) or permission of the Department.

Lectures and seminars three hours a week.

Psychology 49.331★

Patterns of Twentieth-Century Psychology

An investigation of the major systems and theories reflected in the course of twentieth-century psychology. The collapse of structuralism and the emergence of functionalism, Gestalt psychology and psychoanalysis. The rise and fall of behaviourism. Major late-twentieth-century trends in psychology.

Prerequisites: Psychology 49.100 and 49.230★ (or 49.300★, no longer offered).

Not offered 1990-91.

Psychology 49.340

Community Psychology and Program Evaluation (Honours Seminar)

A survey of the major theoretical and research efforts in community psychology and the major methodological issues in program evaluation. Major themes include: the analysis of human-social problems; the social context within which behaviour problems are generated, main-

tained and labelled as problems; a commitment to systematic assessment and conceptualization, intervention and research/evaluation; and the realities of formal and informal decision-making processes within organizations. Students may be required to participate in field work.

Prerequisites: Psychology 49.200 (or 49.200★, no longer offered), 49.210★ and permission of the Department. Limited enrolment, intended for Honours students.

Lectures, seminars, tutorials, and field work six hours a week.

Psychology 49.342★

Criminal Behaviour

An examination of behavioural approaches to the classification and treatment of offenders. Theories and research relevant to selected patterns of law-breaking and selected offender types are reviewed. The value of behaviour modification and counselling programs within prisons is examined.

Prerequisite: Psychology 49.210★ or 49.260★.

Lectures and seminars three hours a week.

Psychology 49.343★

Addiction

A critical review of social-psychological theories and research on the acquisition and maintenance of addictive behaviour. The rationale and outcome of treatment programs for the abuse of alcohol, tobacco, the opiates and the amphetamines.

Prerequisites: Two credits in Psychology including Psychology 49.100.

Lecture three hours a week.

Psychology 49.344★

Play, Recreation and Sport Psychology

Behavioural and experiential aspects of selected forms of non-work activity are analyzed to establish how the activities are to be identified, what functions they serve and what factors control or influence their modes of expression.

Prerequisites: Psychology 49.200 (or 49.200★, no longer offered) and at least one of Psychology 49.210★, 49.250★ or 49.260★.

Lectures and seminars three hours a week.

Psychology 49.345★

Psychology of Motivation and Emotion

A historical review of the concepts of motivation and emotion is provided as a foundation for a detailed examination of such current concepts as anxiety, stress and depression, among the emotions, and obesity, sexual behaviour and the need to achieve, among the motivations. Material is drawn from the physiological, cognitive, social and personality areas of psychology to gain a comprehensive coverage of the selected topics.

Prerequisite: Psychology 49.100.

Lectures and seminars three hours a week.

Psychology 49.346★

Psychological Factors in Health and Illness

Topics covered include sociocultural influences on physical health, psychological factors in physical disease, behavioural diagnostic techniques, pain and its regulation, factors affecting compliance to therapy, and behavioural variables in the treatment and management of physical disorders.

Prerequisite: Psychology 49.100.

Lectures and seminars three hours a week.

Psychology 49.347★

Behaviour Modification

Basic principles of learning and operant conditioning are related to aspects of behavioural analysis including techniques such as systematic desensitization, relaxation and counter-conditioning. Representative problem areas include retardation, obesity, smoking, alcoholism and phobias.

Precludes additional credit for Psychology 49.272★ and 49.341★, no longer offered.

Prerequisite: Psychology 49.270★.

Not offered 1990-91.

Psychology 49.350

Developmental Psychology (Honours Seminar)

The major theoretical and empirical approaches within developmental psychology are examined through a detailed consideration of selected topics. Students may be required to complete independent research projects.

Prerequisites: Psychology 49.200 (or 49.200★, no longer offered), 49.250★, and permission of the Department. Limited enrolment, intended for Honours students.

Lectures, seminars and laboratory tutorials six hours a week.

Psychology 49.351★

Psychology of Early Childhood

Development of the child from birth through the pre-school years of life; effect of early experience on later behaviour.

Note:

No more than two of the following developmental branching courses may be credited towards the B.A. degree: Psychology 49.351★, 49.352★, 49.353★, 49.354★.

Prerequisite: Psychology 49.250★.

Lectures and seminars three hours a week.

Psychology 49.352★

Psychology of Middle Childhood

Development of the child during the elementary school years.

Note:

No more than two of the following developmental branching courses may be credited towards the B.A. degree: Psychology 49.351★, 49.352★, 49.353★, 49.354★.

Prerequisite: Psychology 49.250★.

Lectures and seminars three hours a week.

Psychology 49.353★

Psychology of Adolescence

Psychological growth and development from puberty to maturity.

Note:

No more than two of the following developmental branching courses may be credited towards the B.A. degree: Psychology 49.351★, 49.352★, 49.353★, 49.354★.

Precludes additional credit for Interdisciplinary 04.201, no longer offered.

Prerequisite: Psychology 49.250★.

Lectures and seminars three hours a week.

Psychology 49.354★

Psychology of Adult Development and Aging

Development and change after the age of physical maturity.

Note:

No more than two of the following developmental branching courses may be credited towards the B.A. degree: Psychology 49.351★, 49.352★, 49.353★, 49.354★.

Precludes additional credit for Psychology 49.254★ or 49.257★, no longer offered.

Prerequisite: Psychology 49.250★.

Psychology 49.355★

Exceptional Children

Selected topics concerning exceptional children such as mentally retarded, brain damaged, physically handicapped, disturbed and gifted children.

Precludes additional credit for Psychology 49.256★, no longer offered.

Prerequisite: Psychology 49.250★.

Lectures and seminars three hours a week.

Psychology 49.360

Personality (Honours Seminar)

Issues and research methodologies in the study of personality. Included may be a consideration of research on psychopathology and personality theory, and evaluation of psychotherapy/counselling process and outcome. Students may be required to complete independent research projects.

Prerequisites: Psychology 49.200 (or 49.200★, no longer offered), 49.260★ and permission of the Department. Limited enrolment, intended for Honours students.

Lectures, seminars and laboratory tutorials six hours a week.

Psychology 49.361★

Psychoanalytic Theories

Origin and evaluation of psychoanalytic theories with an emphasis on Freud and Jung.

Prerequisite: Psychology 49.250★ or 49.260★.

Lectures and seminars three hours a week.

Psychology 49.362★

Self Theories

An evaluation of the assumptive bases and research evidence relating to the positions of Rogers, Maslow and others.

Prerequisite: Psychology 49.260★.

Lectures and seminars three hours a week.

Psychology 49.363★

Psychology of Women

An examination of the literature on the psychology of women. Topics to be considered include: theories of female personality development, sex differences in ability and personality, biological influences on female behaviour, female sexuality, sex roles, women's roles throughout the life span.

Prerequisite: At least one of Psychology 49.210★, 49.250★ or 49.260★.

Lecture three hours a week.

Psychology 49.364★

Abnormal Psychology

History of the concept of behavioural abnormality. Theory and selected research dealing with the nature and etiology of behavioural abnormality.

Prerequisite: Psychology 49.250★ or 49.260★ or 49.100 and Third-year standing.

Lecture three hours a week.

Psychology 49.365★

Transpersonal Psychology

This course represents the viewpoint that the scientific study of direct experience can provide valuable knowledge concerning the nature of human consciousness. Concern is also directed towards understanding techniques for altering consciousness and to systems of thought that make the experiences meaningful.

Prerequisite: Psychology 49.200 (or 49.200★, no longer offered) or 49.300 or three credits in Psychology.

Not offered 1990-91.

Psychology 49.370

Cognition (Honours Seminar)

Issues and research methodologies in the study of cognitive processes involved in perception, attention, language, reasoning, problem solving, decision making, human learning, and memory are considered. Throughout the course the major theoretical issues and the empirical studies of human cognition are examined. Students may be required to complete independent research projects.

Prerequisites: Psychology 49.200, (or 49.200★, no longer offered), 49.270★ and permission of the Department. Limited enrolment, intended for Honours students.

Lectures, seminars, and laboratory tutorials six hours a week.

Psychology 49.372★

Perception

A consideration of data and theory concerning perceptual processes. Such topics as psychophysical methodology, perception of form and space and perceptual learning are discussed.

Prerequisite: Psychology 49.100.

Lecture three hours a week.

Psychology 49.375★

Animal Learning

A survey of research methods used in the study of learning, and the application of these methods to psychopharmacology and behavioural neuroscience.

Prerequisites: Psychology 49.200, (or 49.200★, no longer offered) and 49.270★.

Not offered 1990-91.

Psychology 49.380

Human Assessment (Honours Seminar)

A critical appraisal of assessment techniques used for research, classification, and clinical/counselling purposes. Topics may include reliability, validity, and utility of tests, individual difference measurement in general psychology, ethical issues in testing, and alternatives to orthodox assessment. Laboratory exercises expose the student to selected psychometric and assessment techniques.

Prerequisites: Psychology 49.200, (or 49.200★, no longer offered), and at least one of 49.210★, 49.250★, 49.260★ and permission of the Department. Limited enrolment, intended for Honours students.

Lectures, seminars, and laboratory tutorials six hours a week.

Psychology 49.391★, 49.392★

Practicum in Community Psychology

Through seven-hour-a-week field placements and regular class forums, students are provided with the opportunity to pursue personal learning objectives concerning the application of psychology within the community. Academic requirements are satisfied through a term paper, which integrates the experiential knowledge gained in the placement with theoretical and empirical knowledge gained from the literature review.

Note:

Students registered in the Criminology and Criminal Justice concentration should enrol in Psychology 49.393★ and/or 49.394★.

Prerequisite: Open to Third- and Fourth-year students in Psychology with permission of the Department.

Psychology 49.393★, 49.394★

Field Placement: Criminology and Criminal Justice Concentration

Experience in an agency setting provides the basis for translating the academic dimension into practical involve-

ment in various aspects of criminal justice. These courses are graded on a satisfactory/unsatisfactory basis. There is no supplemental examination in this course.

Prerequisite: Open only to those students formally admitted to and registered in the Criminology and Criminal Justice Concentration.

Psychology 49.401★, 49.402★, 49.403★

Special Topics in Psychology

The topics of this course, to be offered as demand warrants, vary from year to year and are announced well in advance of the period of registration. A list of this year's topics can be obtained from the Psychology Undergraduate Office (B552 Loeb Building) after March 1.

Psychology 49.431★

Precursors of Psychology

Ideas that shaped the emergence in the modern era of psychology as an independent discipline, as evidenced in man's speculations on his nature and his relations to the universe. Mind and body in ancient Egypt, Greece and Rome. Arabic influences and the Middle Ages. Elizabethan psychology. The case for a science of man.

Prerequisites: Psychology 49.100 and 49.230★ (or 49.300★, no longer offered).

Lectures three hours a week.

Psychology 49.432★

Observation, Description and Explanation in Psychology

Problems of communication, concept formation and exploration in biosocial science are discussed. The interplay of facts, methods, models, theories and the human values which these serve are also explored.

Prerequisite: Psychology 49.100.

Lectures and seminars three hours a week.

Psychology 49.490★, 49.492★

Independent Study

A reading or research course for selected students who wish to investigate a particular topic of interest. Available to Third- and Fourth-year students only. Normally students may not offer more than one credit of independent study in their total program.

Prerequisite: Permission of the Department.

Psychology 49.498

Thesis for Honours in Psychology

Candidates for the Honours degree in psychology are required to present a thesis conducted under the supervision of a faculty adviser. The project may take the form of an experiment, a case study, a survey, archival research, or such other work as meets with the adviser's approval. A research prospectus must be presented before the adviser and at least one other member of the Department. The thesis is evaluated by both the adviser and the Psychology 49.498 co-ordinator.

Note:

Summer session registration in Psychology 49.498 is available only to students who were officially registered in and attended meetings of the course during the immediately preceding Fall/Winter session.

Note:

Faculty regulations concerning the Honours thesis are detailed on p. 61.

Prerequisite: Fourth-year Honours standing in Psychology; Psychology 49.300; completion of an Honours Seminar course.

Summer School and Evening Division Courses

The Department of Psychology regularly offers Psychology 49.100, 49.200, 49.210★, 49.220★, 49.230★, 49.250★, 49.260★, 49.270★ and a variety of optional branching courses in the Summer and/or Evening division sessions. The Department of Psychology cannot guarantee that courses required for the Honours degrees will be available in either the Summer session or in the Fall/Winter Evening division.

Dunton Tower, Room 1001
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Officers of the School

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General Information

Public administration is the field of study concerned with the choice, design and implementation of government programs. It is analytical in the sense that it attempts to develop an understanding of why politicians and public servants act the way they do, and of what policies or practices are best able to achieve specified goals. It is practical in the sense that it considers actual policies or practices of government, and methods for their reform.

Public administration is also multi-disciplinary. It draws from other disciplines that have something to say about the opportunities and limitations governments face. Political science examines the political system of which the public service is a part, and the processes by which policy decisions are made. Economics consider the allocation of products and resources in markets with and without government involvement. Law addresses the legal control of public authorities and the rights of citizens. Sociology describes the behaviour and motivation of individuals working in bureaucratic settings. Accounting, quantitative methods, history, science, ethics — all can have a bearing on the field of public administration.

The School of Public Administration was established in 1953, and has the distinction of being the first of its kind in Canada. Students of public administration could wish for no better place to study than the national capital. Ottawa is home to many federal government departments and agencies, as well as national associations, research institutes and non-governmental organizations that deal with public policy issues. All are valuable sources of information for enquiring students. In addition, the federal government is a source of career-oriented summer and term employment.

The School offers two undergraduate programs in public administration. The Bachelor of Public Administration is an Honours program designed for students planning a career

in the public service. Although a majority of the graduates have traditionally found employment in the public sector, many have professions in the private sector, law, journalism and academia. The Certificate in Public Service Studies is designed for public servants without university training who would like to broaden their educational background through career-related part-time study. Credits taken under the Certificate can subsequently be applied toward a Bachelor of Arts or the Bachelor of Public Administration degree.

Bachelor of Public Administration

Qualifying University and First years are offered in both Day and Evening divisions. The last three years are offered in the Day division only.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all School regulations and requirements as set out below.

Admission Requirements

Same as for Faculty of Social Sciences. (See pp. 24-30.)

Admission to Second year will be guaranteed only to students who complete First year with grades of B- or better in both Economics 43.100 and Political Science 47.100 and whose overall grade-point average in First year is at least 8.0 (calculated on five credits, including failures). If further spaces are available, they will be filled in order of academic merit (calculated on five credits, including failures), and provided students have completed both Economics 43.100 and Political Science 47.100.

Requirements for continuation in Honours are found on pp. 59-64.

Course Requirements

Candidates for the degree of Bachelor of Public Administration must satisfy all requirements for the B.A. with Honours. (See pp. 59-64).

The Bachelor of Public Administration Program comprises 20 credits, of which 15 are made up by required courses. The School encourages students to take the required courses in the sequence outlined below, in order to avoid timetable conflicts. The School also encourages students to choose as options those courses that are prerequisites for the particular Management and Policy Electives they are considering.

The First year includes two credits made up by required courses. They introduce the major political ideas and institutions in Canada and other countries, and introduce the behaviour of consumers, producers and governments in individual markets and in the aggregate economy.

The Second and Third years include eight credits made up by required courses that provide a broader background in political science and economics, and a basic knowledge of law, accounting and quantitative methods. The courses in political science emphasize the Canadian political system and the role of the public service within it. The courses in economics emphasize the taxing and spending powers of government. The law course addresses the legal context in which public authorities operate. The accounting and quantitative methods courses develop skills in the collection and interpretation of data useful to both private and public

organizations. The Third year also includes a seminar in policy analysis that considers various theories of government decision making, with particular attention being paid to the integration of the insights, offered by the various disciplines to which the students have already been introduced.

In Fourth year, students specialize. They select courses that reflect their own career or research interests from a wide selection of Management and Policy Electives. They also write an Honours Essay — an in-depth research paper written under the supervision of an individual faculty member. A topics seminar allows students to present their own research and to discuss that of others.

The School requires students to have a reading knowledge of French. This requirement is satisfied by successfully completing one of the following courses:

French

20.106★ Reading French
20.108 Advanced French for Non-Majors
or by demonstrating an equivalent level of reading proficiency based on the placement procedure of the Department of French. The French requirement should be satisfied by the end of the Second year.

The course requirements of the B.P.A. program are listed below, by year:

First Year

Economics (1 credit)
43.100 Introduction to Economics
Political Science (1 credit)
47.100 Introduction to Political Science
Approved Options (3 credits)

Students are advised to meet the School's language requirement in their First year. If this is not feasible, then the language requirement must be completed by the end of the Second year of the program.

Second Year

Business (1 credit)
42.100 An Introduction to Accounting; or
42.101★ Principles of Financial Accounting, and
42.102★ Management Accounting

Economics (1 credit)
43.201★ Introduction to Microeconomic Analysis, and
43.211★ Introduction to Macroeconomic Analysis

Law (1 credit)
51.205 Introduction to Public Law

Political Science (1 credit)
47.200 Canadian Government and Politics

Approved Option (1 credit)
(French requirement must be completed if not completed in First year)

Third Year

Economics (1 credit)
43.347★ Public Finance: Taxation, and
43.348★ Public Finance: Expenditures; or
43.441★ Public Sector Economics: Taxation, and
43.422★ Public Sector Economics: Expenditure

Political Science (1 credit)
47.340 Canadian Public Administration

Quantitative Methods (1 credit)
43.220 Statistical Methods in the Social Sciences; or
47.270 Quantitative Political Science Research Methods

Organizational Behaviour (1/2 credit)
42.210★ Management and Organizational Behaviour; or
42.317★/43.357★ Introduction to Industrial Relations; or
51.345★ Labour Law; or
53.346★ Industrial Sociology

Public Administration (1/2 credit)
50.301★ Policy Analysis for Public Administration

Approved Option (1 credit)

Fourth Year

Public Administration (1 1/2 credits)
50.401★ Selected Topics in Public Administration
50.498 Honours Essay

Management and Policy Electives (3 1/2 credits)

Courses drawn from the Management and Policy categories must total 3 1/2 credits, with at least 1 credit coming from each category. Courses other than those listed below may be used as electives, with the written approval of the Undergraduate Supervisor.

(A) Management Electives (1 to 2 1/2 credits)

Business
42.311★ Micro-Organizational Behaviour
42.312★ Personnel Management
42.361★ Business and Its Environment

Economics
43.435 Manpower Economics and Labour Policy
43.465 Industrial Relations

Political Science
47.300★ Canadian Provincial Politics
47.301★ Canadian Provincial Government and Inter-governmental Relations
47.302★ Canadian Municipal Government
47.303★ Canadian Urban Politics
47.305★ Ontario Government and Politics
47.306★ Social Power in Canadian Politics
47.313★ Women in Politics: A Comparative Perspective
47.403★ Politics and the Media
47.405 Federalism
47.406★ Legislative Process in Canada
47.407★ The Politics of Law Enforcement in Canada
47.408★ National Security and Intelligence in the Modern State
47.409★ Politics in Quebec
47.416★ Labour and the Canadian State
47.417★ Political Participation in Canada
47.440★ Comparative Public Administration
47.441★ Business-Government Relations in Canada
47.446★ Theories of Public Administration
47.447★ Decision Theory and Policy Studies
47.448★ Public Organizations: Theory and Practice

Geography
45.333★ Municipal Land-Use Planning in Canada
45.433★ Urban Planning (82.333★)

Law

- 51.327★ International Economic Law: Trade and Investment
- 51.328★ International Economic Law: International Regulation
- 51.350★ Constitutional Law
- 51.374★ Local Government Law
- 51.440★ Arbitration Process in Industrial Relations
- 51.445★ Labour Relations in the Public Service
- 51.451★ Selected Problems in Comparative Constitutional Law
- 54.456★ Administrative Law I
- 51.457★ Administrative Law II

Architecture

- 78.340★ City Organization and Planning Processes

(B) Policy Electives (1 to 2 1/2 credits)**Philosophy**

- 32.330 Social and Political Philosophy

Economics

- 43.346★ Agricultural Economics
- 43.356★ Introduction to Labour Economics
- 43.360★ Topics in International Economics
- 43.361★ International Trade
- 43.362★ International Monetary Problems
- 43.363★ Economic Development
- 43.380★ Topics in Canadian Economic Policy
- 43.385★ Economics of Natural Resources
- 43.415★ History of Economic Thought
- 43.445★ Welfare Economics
- 43.457★ Economics of Development
- 43.458★ International Aspects of Economic Development
- 43.461★ International Trade Theory and Policy
- 43.467★ Monetary Theory I
- 43.468★ Monetary Theory II
- 43.480★ Research Seminar in Urban Economics

Geography

- 45.320★ The Canadian City: Internal Structure and Contemporary Problems

Political Science

- 47.230 History of Political Thought
- 47.345★ Contemporary Public Policy Analysis
- 47.366★ Canadian Foreign Policy
- 47.367★ Canadian Defence Policy
- 47.401 Canadian Public Policy
- 47.402★ Policy Seminar: Northern Development
- 47.413★ The State in Advanced Capitalist Societies

Law

- 51.305★ Law and Regulation
- 51.353 Civil Liberties and Human Rights
- 51.354★ Law and Native Peoples
- 51.380 Law of Environmental Quality
- 51.463★ Immigration and Refugee Law

Sociology-Anthropology

- 53.380 Social Policy
- 53.373★ Criminal Justice Policy

Engineering

- 82.434★ Transportation (45.434★)

Mention: français

Students proficient in French may wish to earn the

University's Mention: français designation by taking the following pattern of courses in their degree program:

Students must undergo placement testing by the Department of French in order to satisfy the language requirement, and to protect the integrity of the initiative. At least one credit from the Second, Third or Fourth years must be made up by courses at Carleton.

First Year:

One credit in the advanced study of the French language (French 20.112 as a minimum standard; no equivalents can be substituted).

Second and Third Years

Two credits made up by Political Science 47.201, 47.390, or by Second-year courses given entirely in French on French Canadian culture and heritage (French 20.267★, 20.268★, 20.280★, 20.281★), or by other Second-year and Third-year courses offered entirely in French at Carleton or at another university and approved by the Undergraduate Supervisor of the School.

Fourth Year:

One credit made up either by Public Administration 50.498 Honours Essay written in French, or by Third- or Fourth-year courses offered entirely in French at Carleton or at another university and approved by the Undergraduate Supervisor at the School.

Certificate in Public Service Studies

Offered in Day and/or Evening divisions.

The Certificate program is designed primarily for public employees who seek special training in public service subjects at the undergraduate level.

Courses taken for the Certificate may be credited towards a Bachelor of Public Administration or Bachelor of Arts degree. A transfer student from the Certificate program into the Bachelor of Public Administration program will normally be required to take at least 14 further credits in addition to those required for the Certificate, to be recommended for the degree. A transfer student into a Bachelor of Arts program will normally be required to take at least nine further credits. At least five of the credits required for either degree must be completed after the awarding of the Certificate.

Full-time candidates for the Certificate are invited to enquire about possible financial aid.

Admission Requirements

The basic admission requirement is the completion of the Ontario Secondary School Diploma including six Ontario Academic Courses or the Ontario Secondary School Honour Graduation Diploma, or the equivalent, with a minimum overall average of 60 percent. Special consideration will be extended to other applicants under Mature Applicant regulations (see pp. 28-29).

Candidates may be admitted with advanced standing, but must complete at least four credits, including all core courses, for the Certificate at Carleton University.

Students who have completed an undergraduate degree are not eligible for admission to the Certificate program. They are encouraged, however, to investigate the undergraduate and graduate degree and diploma programs offered by the School.

Course Requirements

The following courses are required and the following order is suggested:

1. Political Science 47.100
2. Economics 43.100
3. History 24.130 or 24.233 or 24.234 or 24.235
4. Political Science 47.200
5. Political Science 47.340
6. One other credit chosen in consultation with the Director according to the needs of the students.

Academic Standing

A candidate for the Certificate must obtain a grade of C or better in at least half of the credits taken at Carleton University for the certificate.

Courses Offered

Public Administration 50.301★

Policy Analysis for Public Administration

A multi-disciplinary seminar that involves the participation of several faculty members. It explores various theoretical approaches for analyzing the origins and effects of problems in public policy, and evaluating alternative responses to those problems.

Prerequisite: Third-year standing in Public Administration.

Day division, Winter term: Seminar three hours a week.

Public Administration 50.401★

Selected Topics in Public Administration

A seminar that provides an opportunity for interaction between students and faculty directed toward examining current issues in Public Administration.

Prerequisite: Public Administration 50.301★.

Day division, Winter term: Seminar three hours a week.

Public Administration 50.498

Honours Essay

Tutorial hours arranged.

Dunton Tower, Room 2121
Telephone: 788-2100

Officers of Instruction

Chair

Leonard T. Librande

Professors

John P. Dourley
Antonio R. Gualtieri
Robert M. Polzin
Stephen G. Wilson

Associate Professors

Nalini Devdas
Leonard Librande
Joseph G. Ramisch
Eugene Rothman

General Information

The general purpose of courses offered in this Department is to promote a sensitive and intellectually mature understanding of the basic ideas and concerns of outstanding religious leaders and movements irrespective of whether these coincide or conflict with individual convictions. Religious writings are studied critically, in an attempt to understand their meaning, to grapple with their problems and to assess their significance both in their original cultural context and for our own situation.

Programs of Study

Students who elect Religion as their Pass or Honours subject will consult with their respective departmental adviser before registration each year.

Department program advisers are:

Honours, R.M. Polzin
Pass, J. Ramisch
Graduate Supervisor, John Dourley

Main Areas of Study

Religion courses are offered in three main areas:

1. Philosophical-Theological Studies of Religion: Religion 34.203★, 34.235, 34.238★, 34.243, 34.260, 34.265★, 34.266★, 34.280, 34.306, 34.331★, 34.332★, 34.390, 34.488★.
2. History of Religion: Jewish and Christian Traditions: Religion 34.102★, 34.103★, 34.107★, 34.108★, 34.219, 34.225, 34.270, 34.271★, 34.272★, 34.273★, 34.321★, 34.323, 34.330, 34.331★, 34.332★, 34.338★, 34.355★, 34.378★, 34.390, 34.486★.
3. History of Religion: Other Religious Traditions: Religion 34.105★, 34.106★, 34.109★, 34.204, 34.205, 34.211★, 34.212★, 34.230★, 34.278, 34.320★, 34.331★, 34.342★, 34.390, 34.484★.

For classification of Religion 34.237★, 34.331★, 34.332★, 34.336★ and 34.390 each year, consult the Majors Adviser.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Pass Programs

Students in a Pass program in Religion shall acquire six credits in Religion. Of these six credits, Religion 34.202 and one credit at the 300 level or above are required. In addition, of these six credits, at least one must be in each of the three main areas of study as set forth above. Courses shall be selected in consultation with the Majors Adviser.

Combined Pass Programs

A Pass program combining Religion with another subject must include at least four credits in Religion. The precise pattern of courses for each student must be approved by the Departmental Pass Program Adviser.

Honours Programs

Honours In Religion

The Honours program may be entered at the beginning of the First year or in later years or by transfer from the Pass program.

Students in the Honours program shall acquire ten credits in Religion. In acquiring six of these credits the student shall fulfil the Pass requirements set forth above. In addition, the student shall acquire four other credits of which two shall be at the 400 level, that is, Religion 34.498 or other 400-level seminars. Courses shall be selected in consultation with the Honours Adviser.

Combined Honours Program

Students enrolled in a Combined Honours program are required to take seven credits in Religion. In acquiring six of these credits the student shall fulfil the Pass requirements set forth above. In addition, the student shall acquire one credit at the 400 level. The precise pattern of courses for each student must be approved by the Departmental Honours Adviser.

Combined Honours in Philosophy and Religion

Philosophy: At least seven credits including:

1. an introductory course or equivalent;
2. 6.0 credits beyond the 100 level including:
 - (a) 2.0 credits in history of philosophy;
 - (b) Philosophy 32.260, or if taken already as Religion 34.260 or if not available, 1.0 credit in philosophical problems, selected in consultation with the Honours Adviser;
 - (c) 1.0 credit at the 400 level.

Religion: Requirements are those listed above for the Combined Honours program.

Courses Offered

Note:

Religion 34.102★ and 34.103★ are so scheduled as to allow the student to take one of them in each term in the same time slot. Students who took Religion 34.120, no longer offered, may not register for either of these courses.

Religion 34.102★

Introduction to the Literature of the Hebrew Bible (Old Testament)

An examination of the books of the Hebrew Bible. Emphasis is given to literary approaches to the text, that is, to the kind of disciplined attention that has illuminated the manifold examples of world literature through a variety of critical approaches.

Day division, Fall term; Evening division, Winter term.

Religion 34.103★

Introduction to New Testament Literature

A general survey of New Testament literature. An examination of its background in the Roman world and sectarian Judaism. The formation of the Canon and the Synoptic Problem. The texts focused on are the Gospels, Acts, writings of Paul, the Johannine literature and the Book of Revelation.

Students taking this course are also encouraged to take Religion 34.102★.

Evening division, Fall term; Day division Winter term.

Note:

Religion 34.105★ and 34.106★ are so scheduled as to allow the student to take one of them in each term in the same time slot.

Religion 34.105★

Introduction to the Hindu Tradition

An introduction to the basic beliefs, myths and symbols, methods of meditation and ethical principles developed in the main branches of the Hindu tradition. The study includes a survey of movements stemming from the Hindu tradition such as Transcendental Meditation and Krishna Consciousness.

Day division, Fall term.

Religion 34.106★

Introduction to the Buddhist Tradition

An introduction to the basic beliefs and practices of the Buddhist tradition and a brief survey of its developments and transformations in India, Sri Lanka, Southeast Asia, Tibet, China and Japan.

Day division, Winter term.

Religion 34.107★

Christianity

An introduction to Christian thought, Catholic and Protestant, concerning such major issues as the character of God, the role of Christ and the Church, the authority of the Bible, human nature and destiny, the ecumenical and charismatic movements, the ordination of women, and the impact of secular culture.

Evening division, Fall term; Day division, Winter term.

Religion 34.108★

Introduction to Judaism and the Jewish People

An introduction to Judaism and the Jewish people from the earliest times until the present day. Special emphasis is placed on the history of the Jewish people in the rabbinic age, Jews in the Muslim world, the medieval era, and in the modern era in Europe, North America and Israel. The

course also deals with the organization, basic beliefs, social and ethical practices of the Jews and Judaism.
Winter term.

Religion 34.109★

Introduction to Islam

An introduction to the Muslim religious tradition and investigation of its organization, basic beliefs, social and ethical principles and practices.

Evening division, Fall term; Day division, Winter term.

Religion 34.112★

Introduction to the Psychology of Religion

An introduction to the psychology of religion, which examines the major contributions of psychology to the study of religion, religious experience, and the religious personality through various individuals and schools in the tradition of James, Freud, Jung, Fromm, Erickson and Maslow.

Day division, Winter term.

Religion 34.202

Interpretations of Religion

This course surveys modern enquiries into the nature of religion from various perspectives such as anthropology, history, psychology, sociology and theology. Contrasting views of self, society, nature, God, history and ultimate destiny conveyed by the myths, symbols, scriptures, doctrines, codes and rituals of religious traditions are examined. Specialists within the Department lecture on specific religious traditions.

Day division.

Religion 34.203★

Women in the Christian Tradition

An examination of the status of women in Christianity, including such themes as images of women and gender roles in churches, recent feminist theologies, practical questions such as inclusive language and the ordination of women, and alternative approaches to Christian spirituality.

Day division, Fall term.

Religion 34.204

The Hindu Tradition: A Historical Survey

A discussion of the systems of thought and the techniques of yoga developed in the Hindu tradition, with special emphasis on Vedanta. The study includes a discussion of the responses of Hinduism to the impact of modernity.

Day division.

Religion 34.205

The Buddhist Middle Way: Its Indian Developments

A survey of the concepts and techniques of meditation developed in Indian Buddhism from its origin until the twelfth century A.D.; an introduction to Buddhist art and mythology; a brief account of Tantric Buddhism in India and Tibet.

Not offered 1990-91.

Religion 34.211★

Ancient Near Eastern Religions

An investigation of selected writings in English translation from Egypt, Mesopotamia, and Israel. The writings studied include narrative, myths, wisdom literature, hymns and poetry. Major themes of this literature include: the world of the gods; the creation of the universe; friendship; the inevitability of death; how to succeed in business and life.

Not offered 1990-91.

Religion 34.212★**Graeco-Roman Religions**

A study of selected topics in Graeco-Roman religion, such as Homeric religion, chthonic cults, the Sophists, astrology, ruler cults, mystery religions and gnosticism.

Not offered 1990-91.

Religion 34.219**Life, Thought and Wisdom in Ancient Israel**

An examination of the major methods used by scholars in studying the Hebrew Bible (i.e., source criticism, form criticism, and tradition history) and how these relate to new approaches such as literary or structural analysis. Topics include creation and myth, Israel's patriarchs, the exodus from Egypt, revelation at Sinai, the occupation of Canaan, tensions between religious faith and personal experience, God and the presence of suffering in the world, rules for success in life and business, the religious sceptic, the problems of suicide and the delights of human love.

Day division.

Religion 34.225**The Life and Teaching of Jesus**

The course is concerned with a systematic study of the available records of the life of Jesus. Class periods are mainly taken up with free class discussions of successive sections of the gospel parallels of Matthew, Mark and Luke. There are accompanying lectures and readings on the historical context of the life of Jesus and on the milieu within which the records developed.

Day division.

Religion 34.230★**Mysticism**

A historical and functional study of mystical experience in its religious context, relying on examples from selected traditions such as the Christian, Buddhist, Hindu, Jewish and Muslim.

Precludes additional credit for Religion 34.230, no longer offered.

Day division, Fall term.

Religion 34.231★**Selected Topics in the Study of Mysticism**

Contents of this course may vary from year to year.

Not offered 1990-91.

Religion 34.235**Religion and Contemporary Moral Issues**

An analysis of the nature of religious ethics, both the explicit moral principles and rules of various religious traditions, and the general moral perspectives generated by religious images of ultimate reality, history, human nature and the physical world. In the light of this, contemporary moral issues such as the following are examined: cultural integrity (e.g., Indian, Inuit, Québécois), violent liberation and just war, crime and punishment, sexuality, role of men and women, marriage, abortion, alienation in modern society, drugs, economic order and conflict, ecology and pollution. Prerequisite: Any other Religion course or permission of the Department.

Not offered 1990-91.

Religion 34.237★**Selected Topics in Religion**

Contents of this course vary from year to year.

Not offered 1990-91.

Religion 34.238★**Death and Afterlife**

The meaning of death and afterlife in some religious traditions and secular philosophies with emphasis on the Hindu teaching of the immortal soul; the Hebraic idea of collective survival; the Christian doctrine of resurrection of the body; the Buddhist conception of no-soul and nirvana.

Day division, Fall term.

Religion 34.243**Religion and Society**

Offered in the Department of Sociology and Anthropology as Sociology-Anthropology 56.243.

Religion 34.260**Philosophy of Religion**

Offered in the Department of Philosophy as Philosophy 32.260.

Not offered 1990-91.

Religion 34.265★**Historic Figures in the Psychology of Religion**

Discussion of religiously significant texts from the works of William James, Sigmund Freud and C.G. Jung.

Prerequisite: One course in Religion or Psychology or permission of the Department.

Day division, Fall term.

Religion 34.266★**Contemporary Psychologies of Religion**

An examination of developmental, experimental, humanistic and existential theories in psychology as these shed light on religious thought, behaviour and institutions.

Prerequisite: One course in Religion or Psychology or permission of the Department.

Not offered 1990-91.

Religion 34.270**The Development of Christian Thought**

The historical and cultural development of selected aspects of Christian thought from its origins to the modern period. Problems considered are the early shift from a semitic to a hellenistic culture; the beginnings of the church as an institution; the development of thinking about Jesus in the early councils; conciliarism and other theories on the nature of the church; medieval efforts at reform; issues in the Protestant Reformation and its aftermath. Analysis of the way change and development have taken place in Christianity is also included.

Prerequisite: Religion 34.107★ or permission of the Department.

Not offered 1990-91.

Religion 34.271★**Judaism and the Jewish People: The Early Period**

A study of the history of Judaism and the Jewish people from the Maccabees to the Rabbinic Age. Attention is given to the rise of sectarian movements (Pharisees, Sadducees and Qumran Covenanters), the rise of Christianity, revolutionaries such as the Zealots and Bar Kochba, the Jewish responses to Hellenism, the reshaping of Judaism after the destruction of the Second Temple, and Rabbinic Judaism in Palestine and the Diaspora.

Day division, Fall term.

Religion 34.272★**Judaism and the Jewish People: Survival in Medieval Europe**

Jewish life in the medieval world, from the Crusades until the French Revolution, with emphasis on the evolution, structure and organization of the Jewish community in the

Ghetto, religious movements such as mysticism, the false messiahs, and the rise of the Jewish Enlightenment and Hasidism, and Christian-Jewish relations.
Not offered 1990-91.

Religion 34.273★

Judaism and the Jewish People: The Challenge of the Modern Age

The response of the Jews and Judaism to the challenges of modernity: the French Revolution and Emancipation; the spread of the Jewish Enlightenment; the religious reaction; Reform and Conservative Judaism; secular ideologies, nationalism and Zionism; the growth of the Jewish community in North America; anti-semitism and the Holocaust; and the emergence of the State of Israel.
Not offered 1990-91.

Religion 34.274

The Formative Periods of Islam

A study of one major period in the development of Islam: (1) *The Classical Period (610-1258)*, study of the transformation of an Arab sect into a universal religious community dominating an empire and of the factors which made it a successful religious culture; or (2) *The Medieval Period (1258-1798)*, study of the consolidation of the religious and cultural dimensions of the Muslim community in the period of the great empires.
Not offered 1990-91.

Religion 34.278

The Middle East: 1798 to the Present

The history of the development of the civilization and culture of the Middle East from 1798 to the present with special emphasis on the mutual discovery of East and West, the search for identity, the impact of colonialism and international rivalry, and social, religious and cultural change within a continuing tradition. (Also listed as History 24.278.)
Day division.

Religion 34.280

Modern Religious Thought

An examination of the major currents and developments of religious and philosophical thought among Protestants and Catholics in the nineteenth and twentieth centuries. Protestant developments are traced from the Kantian critique to the present and Catholic thought from its response to the French Revolution up to and beyond Vatican II.
Prerequisite: One course in Religion or Philosophy.
Day division.

Religion 34.303★

Paul Tillich and the Divine-Human Relation

The course examines Tillich's conception of God as Ground of Being and Depth of Reason, drawing on selections from his essays, lesser works and *Systematic Theology*.
Precludes additional credit for Religion 34.306, no longer offered.

Religion 34.304★

Tellhard de Chardin: Christianity and Evolution

The course examines Teilhard's correlation of a Christian with an evolutionary perspective from his early writings (First World War) through to his late synoptic essays.
Precludes additional credit for Religion 34.306, no longer offered.
Not offered 1990-91.

Religion 34.305★

C.G. Jung and the Psychology of Religion

The course examines Jung's major statements in the *Collected Works* about the psycho genesis of religion and the

implications this has for the understanding of humanity as religious.

Precludes additional credit for Religion 34.306, no longer offered.

Religion 34.320★

Selected Problems in Indian Thought

Contents of this course vary from year to year. Topic for 1990-91: *The concept of the Mother-Goddess in the Hindu Tradition*. A historical approach to the philosophy, mythology, art and practice that are related to concepts of the Great Goddess in the Hindu tradition.

Prerequisite: Second-year standing or better.

Evening division, Second term.

Religion 34.321★

Selected Topics in Hebrew Bible

Contents of this course vary from year to year.

Not offered 1990-91.

Religion 34.323

Religion and the State, Europe 1815-1965

Offered in the Department of History as History 24.323.

Not offered 1990-91.

Religion 34.330

The Life and Thought of Paul

Paul's relation to the Old Testament, Rabbinic Judaism, and Hellenism; the mission to the Gentiles; the "mysticism" of Paul; central ideas such as justification by faith, predestination, the Holy Spirit, the Church. Consideration of the situation and message of each of Paul's writings.

Prerequisite: Second-year standing or better.

Not offered 1990-91.

Religion 34.331★

Theory and Method in the Study of Religion

Examination of selected theoretical and methodological models used in the interpretation of religious data. Contents of this course vary from year to year. The specific topic for 1990-91: *An examination of Wilfred Cantwell Smith's approach to religious studies*.

Prerequisites: Second-year standing or better and Religion 34.202.

Day division, Winter term.

Religion 34.332★

Studies on Christianity

Selected problems in the study of the Christian religion. For example, an examination of Christ in recent Christian thought. The specific topic may vary from year to year.

Prerequisite: Second-year standing or better.

Not offered 1990-91.

Religion 34.336★

Selected Topics in Religion

Contents of this course may vary from year to year. Topic for 1990-91: *Sacred Space*. An introduction to the role of spatial elements in religious life. The course focuses, first, on the natural landscape as in the geography of religions, and second, on the built environment as in the architecture of religions. Among authors discussed are Mircea Eliade, Yi-Fu Tuan and David Sopher.

Prerequisites: Second-year standing or better and Religion 34.202. Also open to final-year students in cultural geography and architecture.

Evening division, Winter term.

Religion 34.338★

Selected Topics in Early Christian History

Contents of this course vary from year to year.

Prerequisite: Second-year standing or better.
Not offered 1990-91.

Religion 34.342★

Selected Topics in Islam

Contents of this course vary from year to year.

Prerequisite: Second-year standing or better.

Not offered 1990-91.

Religion 34.355★

Selected Topics in Judaism and Jewish History

Contents of this course vary from year to year. Topic for 1989-90: *The Jews of Spain*. A survey of the rise of the Sephardi Jewish community in Muslim Spain; the Christian Inquisition and the expulsion of the Jews from Spain in 1492; the re-establishment of Sephardi Jewish communities in the Ottoman Empire, Europe, and the New World; and the contemporary Sephardi revival.

Prerequisite: Second-year standing or better.

Day division, Winter term.

Religion 34.378★

The Reformation Era in European History, 1409-1648

Offered in the Department of History as History 24.378★.

Day division, Fall term.

Religion 34.390

Selected Problems in Interpretation

A course conducted on a tutorial or seminar basis designed to enable advanced students to pursue interests in selected areas of religion.

Prerequisite: Permission of the Department.

Religion 34.484★

Selected Topics in Comparative Religion

Not offered 1990-91.

Religion 34.486★

Seminar in Biblical and Ancient Near Eastern Studies

Contents of this course may vary from year to year. Topic for 1990-91: *Literary Studies of the Deuteronomistic History*. This seminar assumes the unity of Deuteronomy - 2 Kings, and describes key features of this valuable ancient text. The work of literary critics such as M. Bakhtin and B. Uspensky provide a theoretical basis for this course. Special emphasis is given to 1-2 Samuel.

Day division, Winter term.

Religion 34.488★

Seminar in Modern Religious Thought and Culture

Contents of this course vary from year to year. Topic for 1990-91: *Religion and Psyche in the Psychology of C.G. Jung*. An examination of Jung's understanding of the psychogenesis of religious experience and its consequences for the understanding of humanity as religious. The seminar relates Jung's psychology to other psychologies with religious import, and to confirming and contesting theological anthropologies.

Evening division, Fall term.

Religion 34.498 (Two Credits)

Honours Essay

Open to candidates for Honours in Religion in their Fourth year, with the permission of the Department. The subject for research is settled in consultation with a Departmental Director. A written proposal consisting of title, outline and bibliography must be submitted to and approved by the Honours Essay Proposal Board. The essay will be a substantial piece of work of approximately 16,000 words. The essay is jointly evaluated on its completion by the Departmental Director and one other member of the department.

ment.

Precludes credit for Religion 34.499. (Consult Departmental Document for further details.)

Religion 34.499

Honours Essay

Open to candidates for Combined Honours in Religion in their Fourth year with permission of the Department. The subject for research is settled in consultation with a Departmental Director. A written proposal consisting of title, outline and bibliography must be submitted to and approved by the Honours Essay Proposal Board. The essay will be a substantial piece of work of approximately 10,000 words. The essay is jointly evaluated on its completion by the Departmental Director and one other member of the Department. Precludes credit for Religion 34.498. (Consult Departmental Document for further details.)

• Language Courses

Language courses are intended for students specializing in a particular religious tradition. They are offered according to the availability of members of the Department. Courses taken at the 200 level or above will be mainly independent study under the supervision of a member of the Department. Students interested in taking these courses should consult the Department chair.

Religion 34.115

Introduction to Hebrew

An introduction to Hebrew with emphasis on reading comprehension. A study of the prose language of the Hebrew Bible in its basic vocabulary and grammar. Restricted to beginners in the language. When this course is not offered, students are encouraged to consider taking Hebrew 23.150, Modern Spoken Hebrew, offered by the Centre for Applied Language Studies, see p. 67.

Prerequisite: Permission of the Department.

Religion 34.116

Introduction to Arabic

An introduction to modern standard Arabic with emphasis on reading. The course is restricted to beginners.

Prerequisite: Permission of the Department.

Religion 34.117

Introduction to Sanskrit

Introduction to the fundamentals of the language with emphasis on reading and writing skills.

Prerequisite: Permission of the Department.

Religion 34.215

Intermediate Hebrew

Readings in classical biblical Hebrew with emphasis on the grammatical structure and vocabulary of its prose language.

Prerequisites: The appropriate 100-level language course and permission of the Department.

Religion 34.216

Intermediate Arabic

Second-level study of modern standard Arabic grammar and style through readings and exercises.

Prerequisites: The appropriate 100-level language course and permission of the Department.

Religion 34.217

Readings in Sanskrit Literature

A study of selected readings from early Hindu literature.

Prerequisites: The appropriate 100-level language course and permission of the Department.

Religion 34.218

New Testament Greek

A study of the form and content of prescribed readings from the New Testament in Greek with guidance in translation and exegesis.

Prerequisites: The appropriate 100-level language course and permission of the Department.

Religion 34.392

Language Tutorial

An advanced study of a language in which one of the religious traditions has been transmitted.

Prerequisite: Permission of the Department.

Paterson Hall, Room 3A36
Telephone: 788-6646

Officers of Instruction

Chairman
A. Lewinson

Professor
G.R. Barratt

Associate Professors
G. Melnikoff
P. Varnai

Assistant Professor
A. Lewinson

Honours and Pass Supervisor
A. Lewinson

The Russian Program

The Department of Russian offers a flexible undergraduate program. It has been designed to satisfy a range of different academic and professional interests. Courses are offered in the areas of Russian literature, Russian language and linguistics (including an option for translation training), and Soviet period studies. Details of each degree program are listed below. The Department also offers special-interest courses and tutorials in the areas of literature in translation, scientific Russian, applied Russian for international relations, Ukrainian and other Slavic languages, and Hungarian.

The minimum credit requirements for a degree in Russian, after the completion of Russian 36.100 or the equivalent, are as follows: Pass, six; Combined Pass, five; Honours, nine; Combined Honours, seven.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Pass Programs

The minimum requirements for the Pass degree in Russian, after the completion of Russian 36.100, include Russian 36.202, 36.203, 36.260, 36.302 and two additional Russian credits at the 200 level or above. Russian 36.260 should be taken concurrently with 36.202.

The minimum requirements for the Combined Pass degree, after the completion of Russian 36.100 include Russian 36.202, 36.203, 36.260, 36.302 and one additional Russian credit at the 200 level or above. Russian 36.260 should be taken concurrently with 36.202.

Intensive Russian 36.120 is counted as the equivalent of Russian 36.100 and 36.202, but cannot be taken in addition to either Russian 36.100 or 36.202.

Honours Programs

Students should plan their program in accordance with their interests and their needs and in consultation with the Department.

The minimum requirements for the Honours degree in Russian, after the completion of Russian 36.100, include Russian 36.201★ and 36.301★, 36.202, 36.203, 36.260, 36.302 and four additional credits at the 300 or 400 level, including 36.407 or 36.409 and at least one credit at the 400 level.

The minimum requirements for the Combined Honours degree, after the completion of Russian 36.100, include Russian 36.201★ and 36.301★, 36.202, 36.203, 36.260, 36.302, 36.407 or 36.409 and one additional credit at the 300 or 400 level.

Intensive Russian 36.120 is counted as the equivalent of Russian 36.100 and 36.202, but cannot be taken in addition to either Russian 36.100 or 36.202.

Combined Honours programs are possible with a number of other disciplines, among them History, Political Science, Journalism, English, French, Italian, German, Spanish and Linguistics. The Department also participates in the Comparative Literature program, and in the Institute of Soviet and East European Studies.

Combined Honours in Russian and Linguistics, Translation Option

A special Combined Honours program is available to students contemplating a career in Russian to English translation. In this program, the following courses are required:

Linguistics

- 29.100 Introduction to Linguistics
- 29.301★ Phonetics
- 29.303★ Language Analysis
- 29.304★ Grammatical Theory
- 29.485 Structures of English
- 29.490 Tutorial in Linguistics. Tutorial consists obligatorily of directed readings in the theory of translation.

Russian

- 36.120 Intensive Russian, or
- 36.202 Intermediate Russian
- 36.203 Russian Grammar
- 36.302 Advanced Russian
- 36.303 Russian Translation
- 36.404 Russian Style and Composition
- 36.495★ Tutorial. For students in this program a practicum in translation, with analysis and criticism of selected professional translations.
- 36.499 Honours Essay. For students in this program, an annotated translation of a substantial piece of text, with oral defence before a panel consisting of a member of the Department of Russian, a member of the Department of Linguistics, and a professional translator.

French

At least a 100-level credit.

At least five of the remaining credits shall be chosen from offerings in the following areas: Mass Communication (27.111 Introduction to Mass Communication), Business (Accounting), Economics, Geography, Political Science, Law, Sociology-Anthropology, Biology, Chemistry, Geology, Physics, Computer Science, French (above the 100 level). Russian literature courses may also be selected.

Departmental Tutorial Program

Students with advanced or specialized interests in Russian and Slavic studies should examine the tutorials offered by the Department in the areas of literary and language study. These tutorials allow individual or small group study of particular interests for which there is a demand. Enquiries should be directed to the Department or to individual faculty members.

Special Interest Courses

1. *Scientific Russian*: The Department offers a special course of reading and translation for students in the natural and social sciences, and engineering, and for others interested in the rapid acquisition of a reading skill in technical Russian. Russian 36.110 is specifically designed to meet the needs of such students. The course may serve as an optional credit for students in any program.

2. *Applied Russian for International Relations*: The Department offers two Third-year half-credit courses in Applied Russian for International Relations, 36.320★ and 36.321★, to assist interested students in the acquisition of the linguistic knowledge, terminology and language skills needed for international transactions. In addition to reading, translating and writing, there is discussion of various documents and of material from the Soviet press.

3. *Russian Literature Courses in English Translation*: The Department offers one full-credit course, Russian 36.260, and two half-credits, Russian 36.360★ and 36.361★, in which Russian literary works are read and studied in English translations. Conducted entirely in English, these courses are designed for all students wishing to broaden their knowledge of Russian literature and culture. The courses offer opportunities for both a comprehensive survey and a detailed examination of Russian authors.

4. *Other Slavic Languages*: The Department also offers additional optional credits in other Slavic languages:

- (a) A basic sequence of Ukrainian 36.116 and 36.216 (beginning and advanced may be offered on request);
- (b) Bulgarian with an introduction to Macedonian, Old Slavonic, and Serbo-Croat, may be offered on request. Hungarian is also offered. See comments, under Slavic and East European Languages. (p. 237).

5. *East-European Literature in English Translation*: The Department offers Russian 36.291★, Twentieth-Century East-European Literature in English Translation, as a survey of the recent literature of Czechoslovakia, Poland and Hungary. All texts are read in English translation. This course is centred around authors whose concerns extend beyond national boundaries, who are politically and socially revealing, and artistically innovative. The specific Calendar description should be consulted.

Laboratory Facilities

The University's language laboratory provides facilities for drill in aural comprehension. Students may take extra practice in periods in open hours. The language laboratory is used in the following courses: Russian 36.100, 36.120, 36.202.

Departmental Reading Lists

Departmental reading lists will be available from the Secretary, Room 3A36 Paterson Hall (telephone 788-6646). These reading lists give additional information about courses, including texts, instructors and, as available, the scheduling of courses.

Courses Offered

Russian 36.100

Introductory Russian

Introductory course, the aim of which is to ensure an adequate grasp of the mechanics of the language and basic skills in oral comprehension. Reading of texts. One hour a week devoted exclusively to Russian conversation in class. Oral practice in the language laboratory. Compulsory attendance for both classes and laboratory work. Precludes additional credit for Russian 36.120.

Day and Evening divisions: Four hours a week and one laboratory period a week.

Russian 36.110

Scientific Russian

This course is designed to meet the needs of all students in the social and natural sciences, and engineering, and of graduate students in any year who require a reading knowledge of Russian scientific or technical literature. It includes the essentials of grammar, a basic vocabulary and the reading of simple texts.

Not offered 1990-91.

Russian 36.120

Intensive Russian

This course is designed to cover a basic two-year study of the Russian language in one year, and to provide a rapid and thorough grounding in how to read, write and speak Russian. Audiovisual material is used to reinforce comprehension. Students not making satisfactory progress will be advised to transfer to Russian 36.100. Attendance in both classes and laboratory work is compulsory. No auditors.

Precludes additional credit for Russian 36.100 and 36.202. Not offered 1990-91.

Russian 36.201★

Russian Conversation

Conversation and discussion of current topics with special emphasis on everyday Russian. Occasional written work. Compulsory attendance for both classes and laboratory work.

Prerequisite: Russian 36.100 or permission of the Department.

Day division, Fall term: Three hours a week.

Russian 36.202

Intermediate Russian

Continuation of the basic Russian sequence. Grammar studies, composition, oral drill, reading of selected poetry and prose. Compulsory attendance for both classes and laboratory work.

Precludes additional credit for Russian 36.120.

Prerequisite: Russian 36.100 or permission of the Department.

Day and Evening divisions: Four hours a week including laboratory.

Russian 36.203

Russian Grammar

A systematic review of Russian grammar taught in English. Word formation, and morphology, with special emphasis on the most difficult parts of Russian grammar for non-Russians.

Prerequisite: A grade of C or better in Russian 36.100 or permission of the Department.

Day division: Three hours a week.

Russian 36.207

Russian Reading Course

Intensive oral reading practice. The texts are intended for various forms of study in class and at home: reading, oral comprehension, retelling (orally and in writing), spontaneous conversation, précis-writing and home reading.

Prerequisite: Russian 36.100 or permission of the Department.

Three hours a week.

Russian 36.260

Russian Literature in English Translation — Nineteenth and Twentieth Centuries

A study of selected works of Russian and Soviet literature in the general context of European literature and against their social and political background. It includes works by Pushkin, Gogol, Turgenev, Leo Tolstoy, Dostoevsky, Chekhov, Gorky, Sholokhov, Pasternak, Solzhenitsyn.

Day division: Two hours a week.

Russian 36.291 ★ (36.290)

Twentieth-Century East-European Literature in English Translation

This course focuses on the literature of three countries: Czechoslovakia, Hungary and Poland. Following an introduction to the pertinent literary traditions, representative twentieth-century works are treated in detail. Post-World War II developments receive further emphasis. All texts are read in English translations. This course does not count as a credit in Russian, but can serve as an Arts option for all students.

Day division, Fall term: Two hours a week.

Russian 36.301 ★

Advanced Russian Conversation

An advanced sequel to Russian 36.201 ★.

Prerequisite: Russian 36.201 ★ or permission of the Department.

Day division, Winter term: Three hours a week.

Russian 36.302

Advanced Russian

Continuation of the basic Russian sequence. Introduction to prose composition and essay writing; further development of comprehension and self-expression in Russian.

Compulsory attendance for both classes and laboratory work.

Prerequisite: Russian 36.120 or 36.202 or permission of the Department.

Day division: Three hours a week.

Russian 36.303

Russian Translation

A basic course focusing on the principles and practice of translation with emphasis on Russian syntax and extensive exercise in translation of literary and non-literary texts from Russian into English.

Prerequisite: Russian 36.203 or permission of the Department.

Day division: Three hours a week.

Russian 36.320 ★

Applied Russian for International Relations I

This course consists of reading, translation, discussion and writing in Russian of documents, reports and articles. Readings from the Soviet press are studied and insights are obtained into Soviet organizations, Soviet views of Canada, and political and commercial relations between Canada and USSR.

Prerequisites: Russian 36.203 and 36.207 or permission of the Department.

Not offered 1990-91.

Russian 36.321 ★

Applied Russian for International Relations II

This course consists of reading, translation, discussion and writing in Russian, of documents, reports and articles. Readings from the Soviet press are studied and insights are obtained into Soviet organizations, Soviet views of Canada, and political and commercial relations between Canada and USSR.

Prerequisite: Russian 36.320 ★ or permission of the Department.

Not offered 1990-91.

Russian 36.360 ★

Special Topic: Dostoevsky to Chekhov (in English Translation)

Study of particular authors, movements or themes, concentrating on the work of Dostoevsky, Tolstoy and Chekhov. The specific course outline may vary from year to year, but it will regularly focus on the relation between imaginative writing and society. All texts are read in English. This course does not count as a credit in Russian but can serve as an Arts option for all students.

Prerequisite: At least Second-year standing or permission of the Department.

Day division, Winter term: Two hours a week.

Russian 36.361 ★

Special Topic: The Revolution and After (in English Translation)

Study of particular authors, movements or themes, concentrating on the period of the Revolution and its aftermath. The specific course outline may vary from year to year, but it will regularly focus on the relation between imaginative writing and society. All texts are read in English. This course does not count as a credit in Russian but can serve as an Arts option for all students.

Prerequisite: At least Second-year standing or permission of the Department.

Day division, Fall term: Two hours a week.

Russian 36.399

Introduction to Methods of Research

Tutorial on topics of Russian or comparative language and

literature, aimed at training in methods of scholarly research and Slavic bibliography.
Prerequisites: A Russian course at the 300 level and permission of the Department.

Russian 36.404

Russian Style and Composition

Continuation of the basic Russian sequence. Introduction to stylistics and expressive writing. Analysis of semantic and structural peculiarities of modern Russian.

Precludes additional credit for Russian 36.304, no longer offered.

Prerequisite: Russian 36.302 or permission of the Department.

Day division: Two hours a week.

Russian 36.405

Tutorial: History of the Russian Language

A tutorial on the historical development of Russian from Old Slavic to the present, based on studies in historical grammar and reading of selected medieval and modern texts. No auditors.

Prerequisites: Russian 36.203 and permission of the Department.

Not offered 1990-91.

Russian 36.407

Major Authors: Pushkin to Chekhov

A study of selected texts in Russian from major authors of the nineteenth century such as Pushkin, Gogol, Turgenev, Dostoevsky, Tolstoy and Chekhov. Emphasis is placed on the reading of literary texts in a historical context and on the artistic developments in poetry and fiction throughout the period.

Precludes additional credit for Russian 36.335, no longer offered.

Prerequisite: A Russian course at the 300 level or permission of the Department.

Russian 36.409

Major Authors: Gorky to Solzhenitsyn

A study of selected texts in Russian from authors of the twentieth century such as Gorky, Babel, Blok, Mayakovsky, Bulgakov, Zamyatin, Sholokhov and Solzhenitsyn. Emphasis is placed on the reading of literary texts in the context of political and social change and on the study of literary trends, themes and experiments.

Precludes additional credit for Russian 36.355, no longer offered.

Prerequisite: A Russian course at the 300 level or permission of the Department.

Not offered 1990-91.

Russian 36.435★

Tutorial: Special Topic (Literature)

A tutorial offering advanced study of a literary topic in the area of literary history, criticism or theory, to be arranged in consultation with a member of the Department. No auditors.

Prerequisites: A Russian course at the 300 level and permission of the Department.

Russian 36.445★

Tutorial: Special Topic (Drama)

A tutorial offering concentrated study of a topic related to Russian dramatic literature and theatre, to be arranged in consultation with a member of the Department. No auditors.

Prerequisites: A Russian course at the 300 level and permission of the Department.

Russian 36.455

Tutorial: Special Topic (Post-1917 Period)

A tutorial offering study of a topic related to the literature of the Revolution and after, to be arranged in consultation with a member of the Department. No auditors.

Prerequisites: A Russian course at the 300 level and permission of the Department.

Russian 36.493★

Translation Tutorial I

This course is intended for students in the Institute of Soviet and East European Studies, although other students may enrol with the permission of the Department. It offers work in translation to and from Russian, and the objectives of the course are co-ordinated with the specific needs of students in the Institute. No auditors.

Prerequisites: A 300-level Russian language course or equivalent and permission of the Department.

Fall term: Two hours a week.

Russian 36.494★

Translation Tutorial ii

A continuation of Russian 36.493★. No auditors.

Prerequisites: Russian 36.493★ and permission of the Department.

Winter term: Two hours a week.

Russian 36.495★

Tutorial: Special Topic (Language)

A tutorial on topics of language or linguistics, providing individual or small group study. For students in the Translation Option, it will be a practicum in translation with analysis and criticism of selected professional translations. No auditors.

Prerequisites: Russian 36.302 or 36.303 and permission of the Department.

Russian 36.496★

Tutorial: Special Subject

A tutorial on a selected literary or language topic, providing individual or small group study. No auditors.

Prerequisites: A Russian course at the 400 level and permission of the Department.

Russian 36.499

Honours Research Project

A course for independent research and writing under the supervision of a member of the Department, open to students in the Fourth year of Honours. The written assignment for the course is a substantial piece of work of approximately 8,000 words. It is graded by the supervisor in consultation with a second reader. A written statement, outlining the project and approved by the supervisor, must be submitted to the Chairman of the Department by the last day for course changes. For students in the Translation Option the project consists of an annotated translation of a substantial piece of text, with an oral defence before a board consisting of a member of the Department of Russian, a member of the Department of Linguistics and a professional translator.

• **Ukrainian**

Ukrainian 36.116

introductory Ukrainian

An introductory course designed to give students the fundamentals of written and spoken Ukrainian. Grammar, reading and oral practice. Language laboratory. This

course does not count as a credit in Russian, but can serve as an Arts option for all students.
Not offered 1990-91.

Ukrainian 36.216

Advanced Ukrainian

Grammar review, composition, advanced conversation. Reading of selected prose and poetry representing the most typical features of Ukrainian culture in the nineteenth and twentieth centuries. This course does not count as a credit in Russian, but can serve as an Arts option for all students.

Prerequisite: Ukrainian 36.116 or permission of the Department.

Not offered 1990-91.

• **Slavic and East-European Languages**

Slavic 36.390

Slavic Language Tutorial

A study in a Slavic language, other than Russian, which may be useful for research information or translation activities at the graduate or undergraduate level. It includes written and oral exercises in class, as well as translation and reading assignments. Students wishing to study Ukrainian beyond the Ukrainian 36.216 level may enrol in this tutorial. The choice of the language depends on the availability of an instructor. This course does not count as a credit in Russian, but can serve as an Arts option for all students.

Prerequisite: Permission of the Department.

Not offered 1990-91.

Slavic 36.391

Hungarian Language Tutorial

This course is offered at the introductory or the advanced level, for both graduate or undergraduate students. It includes written and oral exercises in class, as well as translation and reading assignments. It does not count as a credit in Russian, but can serve as an Arts option for all students.

Prerequisite: Permission of the Department.

Not offered 1990-91.

Note:

Students interested in Slavic literatures should note the entry for Russian 36.291★, Twentieth-Century East-European Literature in English Translation.

St. Patrick's Building, Room 469
Telephone: 788-5601

Director
Gillian Walker

Undergraduate Co-ordinator
Colleen Lundy

General Information

The School of Social Work, accredited by the Canadian Association of Schools of Social Work, is in the process of developing a Bachelor of Social Work degree program. At the present time, the School offers one core course at the undergraduate level. This course introduces undergraduate students to an overview of the relationship among social work practice, societal change and social programs. The course will be valuable for any student who wants to gain a deeper understanding of the response to social problems by Canadian social welfare programs and social work. For further information consult the Calendar of the Faculty of Graduate Studies and Research.

Courses Offered

Social Work 52.100

Introduction to Social Work and Social Welfare

An overview of social work practice, principles and knowledge base, current social problems and related fields of practice. Attention is also given to the analysis of the relationship between social welfare and Canadian society, and the interrelationship among social work practice, societal change, social problems and social programs.

Lectures three hours a week.

Department of Sociology and Anthropology

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Loeb Building, Room B750
Telephone: 788-2582

Officers of Instruction

Chairman
Stephen Richer

Assistant Chairman
Victor F. Valentine

Co-ordinator of Graduate Program (Anthropology)
Derek G. Smith

Co-ordinator of Graduate Programs (Sociology)
John Myles

Co-ordinator of Honours Program (Anthropology)
Valda J. Blundell

Co-ordinator of Honours Program (Sociology)
Tullio C. Caputo

Co-ordinator of Pass Program
Caryll Steffens

Professor Emeritus
Frank G. Vallee

Professors
Monica Boyd
Jacques Chevalier
Wallace Clement
John J. Cove
Bruce A. Cox
John de Vries
Dennis P. Forcese
John Harp
Alan J. Hunt (*Joint Appointment, Department of Law*)
Gordon Irving
Charles D. Laughlin
Judah Matras
Bruce A. McFarlane
John Myles
Gertrud Neuworth
Terrance A. Nosanchuk
Adam Podgorecki
J. Iain Prattis
Stephen Richer
Victor F. Valentine
Donald Whyte

Associate Professors
Florence K. Andrews
Valda J. Blundell
Hyman Burshtyn
Tullio C. Caputo
Charles C. Gordon (*Joint Appointment, School of Architecture*)
Ken Hatt
Jared T. Keil
Joseph Manyoni
Dennis Olsen
Derek G. Smith
Daiva K. Stasiulis
Allan D. Steeves

Assistant Professors
June S. Corman
Walter S. DeKeseredy
Heather J. Maroney (*Joint Appointment, Women's Studies*)
Caryll Steffens
Lorna E. Weir

Lecturer
Katharine D. Kelly

Adjunct Professor
Muni Frumhartz, *Carleton University*

Adjunct Research Professors
Robert E. Clarke, *Association of Universities and Colleges of Canada*
Bryan C. Gordon, *Archaeological Survey of Canada - Canadian Museum of Civilization*
Alexander Himelfarb, *Ministry of the Solicitor General*
Carol P. LaPrairie, *Department of Justice*
George F. MacDonald, *Canadian Museum of Civilization*
D. Craig McKie, *Statistics Canada*
Hugh A. McRoberts, *Office of the Auditor General*
Heather Menzies, *Author*
William R. Outerbridge, *Criminologist*
Franklin C. Pinch, *Department of National Defence*
Edward T. Pryor, *Statistics Canada*
Leonard Rutman, *Price Waterhouse MCS*
T. John Samuel, *Employment and Immigration Canada*
George M. Torrance, *Consultant*

Research Associates
Gilbert Levine, *Canadian Union of Public Employees*
George Pollard, *Carleton University*

General Information

The Department of Sociology and Anthropology offers the following undergraduate programs:

Pass in Sociology-Anthropology
Honours in Anthropology
Honours in Sociology

All of these programs can be taken either as principal concentrations or in combination with other disciplines. Details of these programs are outlined below.

The several types of courses offered by the Department are indicated by the following numerical prefixes:

53 Sociology
54 Anthropology
56 Sociology-Anthropology

Provided they meet the requirements of the particular program for which they are registered, students may select their courses from any or all of these.

Students may take both Sociology 53.100 and Anthropology 54.100 for credit, but only one will count toward the requirements in any Sociology and/or Anthropology program; the other may be used only as an Arts option. If Sociology-Anthropology 56.100 has been taken, Sociology 53.100 or Anthropology 54.100 may not be taken.

Academic Audit Report

Each student is provided with an Academic Audit Report. This important document is a computerized statement of

the student's degree and disciplinary requirements, matched with the courses completed or in progress; it also includes requirements left to be completed. Students who require assistance with the interpretation of their Academic Audit Report should refer to the *Program Handbook* published by the Arts and Social Sciences Registrar's Office and/or consult with the appropriate departmental program Co-ordinator.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Pass Program

Pass Program in Sociology-Anthropology

1. Students in the Pass program in Sociology-Anthropology must successfully complete *six* credits in the sociology-anthropology field:
 - (a) one of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100;
 - (b) *either* Sociology 53.203 *or* Anthropology 54.203;
 - (c) one credit chosen from: Sociology-Anthropology 56.305, Sociology 53.306, Anthropology 54.310;
 - (d) one further credit in Sociology and/or Anthropology at the 300 level;
 - (e) two additional credits beyond the 100 level in Sociology and/or Anthropology.
2. Students may not count more than *nine* credits in Sociology and/or Anthropology toward a Pass B.A. degree.
3. Final-year students with the required standing may be given permission to take a course at the 400 level. It is also expected that some work will be taken in related disciplines in the Social Sciences.
4. Students are expected to maintain a minimum grade-point average of 4.0 (C-) in the Sociology-Anthropology field.
5. A total of 15 credits beyond Qualifying University year is required.

Students are strongly advised to consult the Co-ordinator of the Pass program regularly throughout their degree studies to ensure that they are observing departmental and University requirements.

Combined Pass Programs

1. Students combining Sociology-Anthropology with another discipline must successfully complete *four* credits in Sociology and/or Anthropology:
 - (a) one of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100;
 - (b) *either* one of: Sociology 53.203, Anthropology 54.203; *or* one course chosen from: Sociology-Anthropology 56.305, Sociology 53.306, Anthropology 54.310;
 - (c) one further credit in Sociology and/or Anthropology at the 300 level;
 - (d) one additional credit beyond the 100 level in Sociology and/or Anthropology.
2. Students may not count more than *seven* credits in Sociology and/or Anthropology toward a B.A. Combined Pass degree.

3. Final-year students with the required standing may be given permission to take a course at the 400 level.

4. Students are expected to maintain a minimum grade-point average of 4.0 (C-) in each Major field.

5. A total of 15 credits beyond Qualifying University year is required.

Combined Pass programs should be worked out in consultation with the departments concerned, and may include other requirements additional to those listed above.

Students are strongly advised to consult the Co-ordinator of the Pass program regularly throughout their degree studies to ensure that they are observing departmental and University requirements.

Honours Programs

General

Honours programs may be entered from the Honours First year in the Social Sciences or by transfer from the Pass program if the appropriate standing has been attained. Students taking Honours in Sociology or Anthropology are expected to meet the general University regulations governing the degree and to fulfil certain additional requirements depending on the program selected. The practicum or the essay will be considered as a credit in determining a student's final standing. The following programs are available.

Sociology

The requirements are:

1. *Nine* credits in Sociology and/or Anthropology:
 - (a) one of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100;
 - (b) *either* Sociology 53.203 *or* Anthropology 54.203 (Sociology 53.203 is recommended);
 - (c) Sociology-Anthropology 56.305 and Sociology 53.306 (it is recommended that students take Sociology-Anthropology 56.305 in the Second year);
 - (d) Sociology 53.370 (it is recommended that students take Sociology 53.370 in the Third year);
 - (e) two half-credit seminars or one full-credit seminar at the 400 or 500 level;
 - (f) Sociology 53.495 or 53.498;
 - (g) two additional credits beyond the 100 level within the Department.

2. A Minor consisting of three credits in one of the following: Economics, Geography, History, Philosophy, Political Science, Psychology, or as arranged in consultation with the Co-ordinator of Honours (Sociology).

3. A maximum of 12 credits in Sociology and/or Anthropology may be counted toward the degree of B.A. with Honours in Sociology.

4. Students entering Fourth year must have and maintain a grade-point average of 6.5 or better in their Major; prior to that, a minimum grade-point average of 6.0 in the Major discipline is required.

5. A total of 20 credits beyond Qualifying University year is required.

It is recommended that students take a course (or courses) involving formal reasoning (e.g., Mathematics 69.109★ or 69.119★, or Philosophy 32.201★) during their first two years.

Students are strongly advised to consult the Co-ordinator of Honours (Sociology) regularly throughout their degree studies to ensure that they are observing departmental and University requirements.

Anthropology

The requirements are:

1. *Nine credits in Anthropology and/or Sociology:*
 - (a) one of Anthropology 54.100, Sociology 53.100, Sociology-Anthropology 56.100;
 - (b) *either* Anthropology 54.203 *or* Sociology 53.203 (Anthropology 54.203 is recommended);
 - (c) Anthropology 54.310, 54.410 and 54.495;
 - (d) two half-credit seminars or one full-credit seminar at the 400 or 500 level;
 - (e) three additional credits beyond the 100 level within the Department.
2. A maximum of 12 credits in Anthropology and/or Sociology may be counted toward the degree of B.A. with Honours in Anthropology.
3. Students entering Fourth year must have and maintain a grade-point average of 6.5 or better in their Major; prior to that, a minimum grade-point average of 6.0 in the Major discipline is required.
4. A total of 20 credits beyond Qualifying University year is required.

Students are strongly advised to consult the Co-ordinator of Honours (Anthropology) regularly throughout their degree studies to ensure that they are observing departmental and University requirements.

Combined Honours in Sociology

Students are strongly advised to consult the Co-ordinator of Honours (Sociology) regularly throughout their degree studies to ensure that they are observing departmental and University requirements.

The general requirements for Combined Honours in Sociology are:

1. One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100;
2. Sociology 53.203 or Anthropology 54.203 (Sociology 53.203 is recommended);
3. Sociology 53.306 or Sociology-Anthropology 56.305 (if the Honours Essay is written in Sociology, Sociology 53.306 is recommended);
4. Sociology 53.370 (it is recommended that students take Sociology 53.370 in the Third year);
5. One full or two half credits in Sociology and/or Anthropology at the 400 or 500 level;
6. (a) If the Honours Essay is written in Sociology, Sociology 53.495 or 53.498 and one additional credit in Sociology and/or Anthropology beyond the 100 level;
- (b) If the Honours Essay is written in the other discipline, two additional credits in Sociology and/or Anthropology beyond the 100 level.

Normally, Honours students will be expected to undertake an Honours Essay in one of the disciplines; in those cases where the second discipline does not require an Honours Essay, alternative arrangements may be considered by the Co-ordinator of Honours (Sociology).

A maximum of *nine* credits in Sociology and/or Anthropology may be counted toward the degree of B.A. with Combined Honours in Sociology and another discipline.

Students entering Fourth year must have and maintain a grade-point average of 6.5 or better in each Major; prior to that, a minimum grade-point average of 6.0 in each Major discipline is required.

It is recommended that students take a course (or courses) involving formal reasoning (e.g., Mathematics 69.109★ or 69.119★, or Philosophy 32.201★) during their first two years.

The following programs are exceptions to the foregoing requirements:

Combined Honours in Sociology and Economics

The requirements in the Sociology component of this program are:

1. One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100;
2. Sociology 53.203 or Anthropology 54.203 (Sociology 53.203 is recommended), followed by Sociology 53.370 or Economics 43.220 (if the Honours Essay is written in Sociology, Sociology 53.370 is recommended; students who take Sociology 53.370 should do so in the Third year);
3. Sociology-Anthropology 56.305 or Sociology 53.306 (if the Honours Essay is written in Sociology, Sociology 53.306 is recommended);
4. One full or two half credits in Sociology and/or Anthropology at the 400 or 500 level;
5. (a) If the Honours Essay is written in Sociology, Sociology 53.495 or 53.498 and one additional credit in Sociology and/or Anthropology beyond the 100 level;
- (b) If the Honours Essay is written in Economics, two additional credits in Sociology and/or Anthropology beyond the 100 level.

A maximum of *nine* credits in Sociology and/or Anthropology may be counted toward the degree of B.A. with Combined Honours in Economics and Sociology.

Students entering Fourth year must have and maintain a grade-point average of 6.5 or better in each Major; prior to that, a minimum grade-point average of 6.0 in each Major discipline is required.

Note:

See also p. 105, and consult the Department of Economics.

Combined Honours in Sociology and Geography

The requirements in the Sociology component of this program are:

1. One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100;
2. Sociology 53.203 or Anthropology 54.203 (Sociology 53.203 is recommended);
3. Sociology-Anthropology 56.305 or Sociology 53.306 (if the Honours Essay is written in Sociology, Sociology 53.306 is recommended);
4. Sociology 53.370 (if the Honours Essay is written in Geography, one optional Sociology and/or Anthropology credit beyond the 100 level can be substituted for Sociology 53.370; students who take Sociology 53.370 should do so in the Third year);
5. One full or two half credits in Sociology and/or Anthropology at the 400 or 500 level;

6. (a) If the Honours Essay is written in Sociology, Sociology 53.495 or 53.498 and one additional credit in Sociology and/or Anthropology beyond the 100 level;
- (b) If the Honours Essay is written in Geography, two additional credits in Sociology and/or Anthropology beyond the 100 level.

A maximum of *nine* credits in Sociology and/or Anthropology may be counted toward the degree of B.A. with Combined Honours in Geography and Sociology.

Students entering Fourth year must have and maintain a grade-point average of 6.5 or better in each Major; prior to that, a minimum grade-point average of 6.0 in each Major discipline is required.

Note:

See also p. 135, and consult the Department of Geography.

Combined Honours in Sociology and Journalism

Students may select a course pattern that will lead, at their option, to either the degree of B.A. with Combined Honours in Journalism and Sociology, or B.J. (with Sociology). At the end of the Third year, students will elect to write their Honours Essay in either Sociology or Journalism. Should students select Sociology, they will be awarded the degree of B.A. upon graduation. Students selecting Journalism will be awarded the degree of B.J. (with Sociology) upon graduation.

The Combined Honours program in Sociology and Journalism requires a total of 20.5 credits. The requirements in the Sociology component of this program are:

1. One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100;
2. Sociology 53.203 or Anthropology 54.203 (Sociology 53.203 is recommended);
- Note:* Mass Communication 27.201 can be substituted for Sociology 53.203 or Anthropology 54.203.
3. Sociology-Anthropology 56.305 or Sociology 53.306 (if the Honours Essay is written in Sociology, Sociology 53.306 is recommended);
4. Sociology 53.370 (it is recommended that students take Sociology 53.370 in the Third year);
5. One full or two half credits in Sociology and/or Anthropology at the 400 or 500 level;
6. (a) If the Honours Essay is written in Sociology, Sociology 53.495 or 53.498 and one additional credit in Sociology and/or Anthropology beyond the 100 level (not including Sociology-Anthropology 56.211);
- (b) If the Honours Essay is written in Journalism, two additional credits in Sociology and/or Anthropology beyond the 100 level (not including Sociology-Anthropology 56.211).

A maximum of *nine* credits in Sociology and/or Anthropology may be counted toward the degrees of B.A. with Combined Honours in Journalism and Sociology or B.J. (with Sociology).

Students entering Fourth year must have and maintain a grade-point average of 6.5 or better in each Major; prior to that, a minimum grade-point average of 6.0 in each Major discipline is required.

Note:

See also p. 164, and consult the School of Journalism.

Combined Honours in Sociology and Mass Communication

The requirements in the Sociology component of this program are:

1. One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100;
2. Sociology 53.203 or Anthropology 54.203 (Sociology 53.203 is recommended);
- Note:* Mass Communication 27.201 can be substituted for Sociology 53.203 or Anthropology 54.203; one additional Sociology and/or Anthropology credit beyond the 100 level would then be required (not including Sociology-Anthropology 56.211, 56.311, 56.430★, 56.431 and 56.432★).
3. Sociology-Anthropology 56.305 or Sociology 53.306 (if the Honours Essay is written in Sociology, Sociology 53.306 is recommended);
4. Sociology 53.370 (it is recommended that students take Sociology 53.370 in the Third year);
5. One full or two half credits in Sociology and/or Anthropology at the 400 or 500 level;
6. (a) If the Honours Essay is written in Sociology, Sociology 53.495 or 53.498 and one additional credit in Sociology and/or Anthropology beyond the 100 level (not including Sociology-Anthropology 56.211, 56.311, 56.430★, 56.431 and 56.432★);
- (b) If the Honours Essay is written in Mass Communication, two additional credits in Sociology and/or Anthropology beyond the 100 level (not including Sociology-Anthropology 56.211, 56.311, 56.430★, 56.431 and 56.432★).

A maximum of *nine* credits in Sociology and/or Anthropology may be counted toward the degree of B.A. with Combined Honours in Mass Communication and Sociology.

Students entering Fourth year must have and maintain a grade-point average of 6.5 or better in each Major; prior to that, a minimum grade-point average of 6.0 in each Major discipline is required.

Note:

See also p. 184, and consult Mass Communication.

Combined Honours in Sociology and Political Science

The requirements in the Sociology component of this program are:

1. One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100;
2. One of the following methods sequences:
(a) in the Second year, Political Science 47.270; in the Third year, Sociology 53.370; or
(b) in the Second year, Sociology 53.203 or Anthropology 54.203 (Sociology 53.203 is recommended); in the Third year, Political Science 47.471★ and 47.472★ (students should note that Political Science 47.471★ and 47.472★ may not be offered every year);
3. Sociology-Anthropology 56.305 or Sociology 53.306 (if the Honours Essay is written in Sociology, Sociology 53.306 is recommended);
4. One full or two half credits in Sociology and/or Anthropology at the 400 or 500 level;
5. (a) If the Honours Essay is written in Sociology, Sociology 53.495 or 53.498 and one additional credit in Sociology and/or Anthropology beyond the 100 level;

(b) If the Honours Essay is written in Political Science, two additional credits in Sociology and/or Anthropology beyond the 100 level.

A maximum of *nine* credits in Sociology and/or Anthropology may be counted toward the degree of B.A. with Combined Honours in Political Science and Sociology.

Students entering Fourth year must have and maintain a grade-point average of 6.5 or better in each Major; prior to that, a minimum grade-point average of 6.0 in each Major discipline is required.

Note:

See also p. 206, and consult the Department of Political Science.

Combined Honours in Sociology and Psychology

The requirements in the Sociology component of this program are:

1. One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100;

2. Sociology 53.203 or Anthropology 54.203 (Sociology 53.203 is recommended and special permission of the Sociology Honours Co-ordinator and the Undergraduate Chairman in the Department of Psychology is required for students who wish to take Anthropology 54.203);

Note: Students who take Psychology 49.200 may substitute one optional Sociology and/or Anthropology credit beyond the 100 level for Sociology 53.203 or Anthropology 54.203.

3. Sociology-Anthropology 56.305 or Sociology 53.306 (if the Honours Essay is written in Sociology, Sociology 53.306 is recommended);

4. One full or two half credits in Sociology and/or Anthropology at the 400 or 500 level;

5. (a) If the Honours Essay is written in Sociology, Sociology 53.370 (which should be taken in the Third year), 53.495 or 53.498, and one additional credit in Sociology and/or Anthropology beyond the 100 level;

(b) If the Honours Essay is written in Psychology, three additional credits in Sociology and/or Anthropology beyond the 100 level.

A maximum of *nine* credits in Sociology and/or Anthropology may be counted toward the degree of B.A. with Combined Honours in Psychology and Sociology.

Students entering Fourth year must have and maintain a grade-point average of 6.5 or better in each Major; prior to that, a minimum grade-point average of 6.0 in each Major discipline is required.

Note:

See also pp. 216-217, and consult the Department of Psychology.

Combined Honours in Anthropology

Students intending to enter an Honours program combining Anthropology with another discipline should take one of Anthropology 54.100, Sociology 53.100, Sociology-Anthropology 56.100 and the introductory course in the other discipline in their First year. A minimum of *six* credits in Anthropology and/or Sociology is required, but not more than *nine* credits in Anthropology and/or Sociology may be counted toward the degree of B.A. with Combined Honours in Anthropology and another discipline.

Students are strongly advised to consult the Co-ordinator

of Honours (Anthropology) regularly throughout their degree studies to ensure that they are observing departmental and University requirements.

The general requirements for Combined Honours in Anthropology are:

1. One of Anthropology 54.100, Sociology 53.100, Sociology-Anthropology 56.100;

2. Anthropology 54.203 or Sociology 53.203 (Anthropology 54.203 is recommended);

3. Anthropology 54.310;

4. One full or two half credits in Anthropology and/or Sociology at the 400 or 500 level;

5. (a) If the Honours Practicum is taken in Anthropology, Anthropology 54.410 and 54.495;

(b) If the Honours Essay is written in the other discipline, two additional credits in Anthropology and/or Sociology beyond the 100 level.

Normally, Honours students will be expected to undertake an Honours Essay in one of the disciplines. In those cases where the second discipline does not require an Honours Essay, alternative arrangements may be considered by the Co-ordinator of Honours (Anthropology).

Students entering Fourth year must have and maintain a grade-point average of 6.5 or better in each Major; prior to that, a minimum grade-point average of 6.0 in each Major discipline is required.

Criminology and Criminal Justice Concentration

For details see p. 102.

Graduate Programs

The Department offers studies leading to the following graduate degrees: M.A. in Sociology, M.A. in Social Anthropology and Ph.D. in Sociology. For further details consult the Calendar of the Faculty of Graduate Studies and Research. Final-year Honours students may take one or more graduate seminars with the permission of the Department.

Prerequisite

The normal prerequisite for courses taken beyond the 100 level is one of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100. Otherwise, students may be admitted with permission of the Department.

Course-Related Tutorials

Students within the Department may include among their courses one or more tutorials. Further information is available from the Undergraduate Program Co-ordinators.

Written permission from the Chairman of the Department of Sociology and Anthropology is necessary before registration in these courses can take place.

Courses Offered

Notes:

(a) *The following is a complete list of all Sociology and Anthropology undergraduate courses offered by the Department. Please note that not all courses are offered every year. Students should consult the University and departmental timetables for a list of courses offered in 1990-91 and their scheduling.*

(b) ★ denotes a half-credit course.

Sociology 53.100

Introduction to Sociology

An introduction to the comparative study of social groups, classes and institutions. The main emphasis is on industrialized societies with special attention given to Canadian society.

Precludes additional credit for Sociology-Anthropology 56.100. *Students in any Sociology and/or Anthropology program should consult the departmental General Information section on p. 239.*

Day and Evening divisions: Lectures and discussion three hours a week.

Anthropology 54.100

Introduction to Anthropology

Anthropology is the study of the alternative ways that humans perceive, believe and behave. The course considers the nature and evolution of human cultural systems and forms of adaptation ranging from hunting and gathering to farming and stratified state formations. Attention is given to such varying institutions as marriage and the family, economics, politics and religion. Both the adaptive and potentially maladaptive aspects of human behaviour are examined.

Precludes additional credit for Sociology-Anthropology 56.100. *Students in any Sociology and/or Anthropology program should consult the departmental General Information section on p. 239.*

Day and Evening divisions: Lectures and discussion three hours a week.

Sociology-Anthropology 56.100

Principles of Comparative Social Structure: Sociology and Anthropology

An introduction to the comparative study of human society from the parallel perspective of sociology and social anthropology. The principal focus is on continuity and change in the development of relatively simple and highly complex societies.

Precludes additional credit for Sociology 53.100 and Anthropology 54.100.

Lectures and discussion three hours a week.

Sociology 53.203

Introduction to Sociological Research

An introduction to general issues in sociological research. Topics include the logic of research, problems of research design, fundamental techniques of data collection in sociology and problems in the ethics of research. Students are introduced to both qualitative and quantitative research methods. (It is recommended that students who plan to take Sociology 53.370 take this course.)

Precludes additional credit for Anthropology 54.203.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and workshop three hours a week.

Anthropology 54.203

Introduction to Anthropological Research

An introduction to general issues in anthropological research. Topics include the logic of research, problems of research design, fundamental techniques of data collection in anthropology and problems in the ethics of research. Students are introduced to both qualitative and quantitative research methods.

Precludes additional credit for Sociology 53.203.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and workshop three hours a week.

Anthropology 54.206★

Cultural Adaptations and the Environment

This course examines the ways in which humans affect and are affected by the natural environment. The focus is upon simpler, non-industrial societies whose modes of subsistence are based upon hunting and gathering, horticulture, or pastoralism. Basic concepts and theories of anthropological ecology are introduced.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Anthropology 54.207★

The Anthropology of Conquest

What is the fate of a small-scale or non-Western society in a situation of partial or pervasive contact with colonial or industrial nation-states? Is it one of mutual adjustment and exchange or one of devastating disruption? This course examines these and other closely related issues with examples drawn from Canadian history and other parts of the world. Specific topics include forced labour and mechanisms of resource appropriation, acculturation and ethnocentrism, wars of extermination and the demographic effects of contact, treaty-making and land policies, revitalization movements and other aboriginal responses to conquest.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.210

Social Psychology

The study of the relationship between the individual and the social system. Emphasis is on integrating individual and social approaches. How does a group influence psychological processes (attitudes, cognitions, motivations, etc.)? How does an individual influence a group? Group processes such as socialization, symbolic interaction, coercion, conformity, leadership, cohesion, etc., are studied.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, introductory Psychology, or permission of the Department.

Lectures and discussion three hours a week.

Sociology-Anthropology 56.211

The Mass Media in Modern Society

An examination of the historical development and current operations of the major mass media, with a view to relating developments to the larger social structure. Emphasis is on the relationship between the media and the structure of Canadian society. (Also listed as Mass Communication 27.211.)

Prerequisites: For students in Sociology and/or Anthropology programs only. One of Mass Communication 27.111,

Sociology 53.100, Anthropology 54.100 or Sociology-Anthropology 56.100.
Lectures and discussion three hours a week.

Sociology-Anthropology 56.220
Canadian Society

The course focuses on the study of Canadian society as an ongoing social system. Alternative theoretical perspectives are developed and examined for the interpretation they provide of recurrent social issues. Special attention is given to persistence and change in regional, ethnic, class and sex-role differences.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Anthropology 54.225
Prehistoric Anthropology, Cultural and Biological Evolution of Humans

An examination, from an evolutionary point of view, of the physical anthropology and archaeology of early humans, their origins, the development of technology and of complex institutions, and the nature of racial differences.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Anthropology 54.230
Social Systems of Non-Western Societies

A study of social anthropology with an emphasis on cross-cultural comparisons of various societies. The course focuses on current directions and debates in the study of kinship, political, economic and symbolic systems, culture change and other areas of anthropological concern.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology-Anthropology 56.235
Ethnic Group Relations

An anthropological and sociological study of minority groups and of ethnic and "race" relations in multi-cultural societies. The course focuses on intergroup processes within a comparative framework.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology-Anthropology 56.241
Kinship, Marriage and the Family

The primary focus of this course is upon contemporary marriage and family life with a major emphasis on the family in Canadian society. The background for this study is developed through the consideration of historical and cross-cultural perspectives on kinship and family forms. Consideration is given to current issues, including changes in marriage and parenthood and associated policy changes.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology-Anthropology 56.243
Religion and Society

A broad survey of religious institutions, with comparative and historical emphases. Examination is made of the major

social, cultural and psychological theories of religion, as well as of the methodological problems associated with the subject matter. Attention is also placed on a range of topics such as totemism, social change, utopian communities, secularization, and the relationship of religion to other social institutions and processes. (Also listed as Religion 34.243.)
Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.247
Women in Society

An enquiry into the historical and contemporary roots of sex-role determination. A comparative analysis of the position of women in various social formations is attempted, in conjunction with an examination of various theoretical perspectives concerning women's societal role. Emphasis is on the Canadian context.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Anthropology 54.248★
The Anthropology of Women

An examination of male and female roles and status in relation to societal factors such as economics, decision-making, and ideology. Emphasis is on the study of women in traditional, and changing, non-Western pre-industrial societies.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Anthropology 54.249★
Development, Dependency and Gender

An examination of anthropological and feminist analyses of the changing gendered division of labour in the Third and Fourth Worlds. Emphases are on case studies that illustrate the impact of "development" or "underdevelopment" on gender roles and gender inequality, and on theoretical understandings which "explain" this impact.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.251★
Introduction to Population Studies

An introduction to the basic principles of demography. Past and present population growth, and the determinants of population growth, are examined. Interrelations among demographic, social, cultural and economic factors are investigated. Where possible, Canadian demographic material is discussed.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.252★
Sociology of Aging and the Elderly

An investigation of the implications of population aging for Canadian social structure and the major issues, theories and research regarding aging and the elderly in contemporary society. The implications of Canada's changing age structure for such institutions as the economy, the polity and the family are examined in a comparative perspective. Social policy issues related to aspects of the aging process

such as retirement and pensions are discussed. Special attention is given to a detailed examination of the composition and living conditions of Canada's elderly.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology-Anthropology 56.253★

Introduction to Human Ecology

The course focuses on interrelationships among population, organization, environment and technology, and on the relationship between man and the natural environment from the perspective of resource use, management and policy.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.254★

Urban Sociology

An examination of questions related to man and the urban environment, including the historical process of urbanization, the rural-urban transition, and the diffusion of urban values and life styles. Some attention is paid to contemporary urban problems, such as urban renewal, pollution and the pressures of the urban environment on social institutions.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.255★

Sociology of Deviance

An analysis of the relation of deviant and criminal behaviour in modern society to the functioning of social systems. A special emphasis is given to theories of causation, types of deviance, the creation and evasion of rules and social roles of deviants.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.256★

Police in Society

An examination of the organization and activities of the police in industrialized societies. Particular attention is devoted to Canadian information, and the themes of social control, police discretion, and the relations of police to a democratic society.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.257★

The Sociology of Work

A study of the sociological aspects of work with particular emphasis on: the changing meaning of work; changing impact of technology; alienation; shift from primary to secondary to tertiary sectors; changing participation rate of men and women; ethnicity and work; impact of social policy; and labour resources problems in developed and developing societies.

Precludes additional credit for Sociology 53.245, no longer offered.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or

permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.258★

The Sociology of Occupations and Professions

A study of the social history of occupations; and an examination of: occupational choice; recruitment; training and careers in non-professional and professional occupations; traditional and non-traditional views of professions, semi and para professions; and the changing participation and experiences of women in traditional and non-traditional occupations.

Precludes additional credit for Sociology 53.245, no longer offered.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.260★

Community

The community is studied as a localized social system in a larger social setting. This involves analysis of demographic and ecological factors as well as a variety of community-based institutions. Special attention is given to decision-making, community planning and development.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.271★

Criminology

The study of the relationship of crime and social structure with a special emphasis on policies and programs by which society reacts to crime.

Precludes additional credit for Sociology 53.270 (no longer offered).

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology-Anthropology 56.284★

Language and Culture

The course surveys several approaches to the study of language in anthropology. Among the topics covered are the evolution of language, the brain and language, communication among non-human primates, historical linguistics, sociolinguistics, the hermeneutics of text analysis, dialectology, body language and non-verbal communication, drum and whistle languages, language change and developmental linguistics. The course involves a laboratory during which the student learns to record linguistic data from a native speaker.

Precludes additional credit for Anthropology 54.371★ taken prior to 1983-84, and for Sociology-Anthropology 56.285★ and 56.326★ taken with the same topic.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or Linguistics 29.100, or permission of the Department.

Lectures and workshop three hours a week.

Sociology-Anthropology 56.285★

Selected Topics

Selected topics in sociology and/or anthropology, not ordinarily treated in the regular course program. The choice of topics varies from year to year.

Sociology-Anthropology 56.286★

Selected Topics

Selected topics in sociology and/or anthropology, not ordinarily treated in the regular course program. The choice of topics varies from year to year.

Sociology-Anthropology 56.291★ and 56.292★

Course-Related Tutorials

See explanatory note on p. 243.

Anthropology 54.301★

Phonetics

Offered in the Department of Linguistics as Linguistics 29.301★.

Anthropology 54.302★

Phonology

Offered in the Department of Linguistics as Linguistics 29.302★.

Anthropology 54.303★

Language Analysis

Offered in the Department of Linguistics as Linguistics 29.303★.

Anthropology 54.304★

Grammatical Theory

Offered in the Department of Linguistics as Linguistics 29.304★.

Sociology-Anthropology 56.305

The Development of Sociological and Anthropological Thought

The development of sociological and anthropological thought since the end of the eighteenth century. Various theoretical approaches are placed within their historical, social and intellectual contexts. The writings of key figures such as Comte, Spencer, Marx, Durkheim, Weber, Malinowski and Radcliffe-Brown are examined and analyzed as illustrations of the development of theoretical approaches in both disciplines.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.306

Contemporary Theoretical Sociology

The course discusses contemporary theoretical perspectives such as symbolic interactionism, phenomenological sociology, ethnomethodology, structural Marxism, and critical theory. In discussing the theories, the lectures focus on current debates concerning the scientific status of sociology, the problem of values, of human agency, intersubjectivity and structure.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Anthropology 54.310

Theory and Methodology in Anthropology

The course addresses questions of theory and methods of analysis in social anthropology. Although some attention is given to early developments in anthropological theory, the emphasis is on the contemporary formulations of functionalism, exchange theory, cultural ecology, structuralism, Marxism, feminism, and critical theory. Special attention is given to the interdependence of theory, methods of research and the analysis of concrete data taken from various societies.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology-Anthropology 56.311

Advanced Study of the Mass Media

An examination of the philosophical and theoretical foundations of mass-communication studies. The course is an analysis of the content of selected theories with a view to assessing the contributions they make to the understanding of mass communication. (Also listed as Mass Communication 27.311.)

Prerequisites: For students in Sociology and/or Anthropology programs only. Mass Communication 27.211 or Sociology 56.211.

Lectures and discussion three hours a week.

Sociology 53.315

Sociology of Education

An examination of educational institutions; their interplay with one another and with other social institutions; the structure of educational opportunity; the school and university seen as organizations; individual and social effects of education; the sociology of learning. The approach is generally comparative and includes a consideration of contemporary critiques of the educational system.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Anthropology 54.317★

Visual Anthropology

This course examines the anthropological experience as reflected in film. A number of problems are considered, including selectivity, bias, the effect of the observer's presence, and problems in reconstructing past events in film.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Anthropology 54.318★

The Prehistory of New World Native Peoples

An examination of the prehistory of the New World, with particular emphasis upon North America. Topics covered include the peopling of the New World, the origins of agriculture and civilization in this area, and the regional prehistories of native peoples. Special attention is given to the prehistoric roots of contemporary Indian and Inuit societies.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Anthropology 54.319★

Issues in Canadian Native Studies

An anthropological examination of issues and policies concerning Canadian Indian, Inuit and Métis peoples. The course explores controversies surrounding social change, native rights, cultural autonomy and women's status. Precludes additional credit for Anthropology 54.219★ (no longer offered).

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology-Anthropology 56.320

French Canada and Québec Society

An analysis of the economic, cultural and political aspects of present-day French Canada and Québec society, with special reference to the interplay of three fundamental themes, i.e., class, culture and nation. Particular attention is also given to the diversity of theoretical perspectives and modes of analysis which prevail in the study of the contemporary situation. A reading knowledge of French is helpful, but is not a prerequisite for the course.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology-Anthropology 56.325★

Selected Topics in Sociology-Anthropology

Selected topics in sociology and/or anthropology, not ordinarily treated in the regular course program. The choice of topics varies from year to year. Topic for 1990-91: *Masculinity and Social Structure*. An analysis of the social construction of masculinity in different social contexts; the institutionalization of male roles in the family-wage context of industrial organization; the articulation of ideologies which legitimize a gendered division of labour and hierarchy of power, and of changes in these structures and practices effected by counter-institutional movements.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology-Anthropology 56.326★

Selected Topics in Sociology-Anthropology

Selected topics in sociology and/or anthropology, not ordinarily treated in the regular course program. The choice of topics varies from year to year.

Anthropology 54.331★

Kinship and Culture

This course examines the nature of peoples' ideas concerning procreation, incest, and social relationships, and variations in descent, marriage, families, and kinship terminologies cross-culturally. The course also relates aspects of kinship to other societal institutions and ideologies.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Anthropology 54.333★

Economic Anthropology

The course is concerned with the culturally varying systems of material production, the unequal distribution of wealth and the effects that decision strategies have on social relations and change in non-industrial societies. Attention is given to fundamental controversies dividing scholars of divergent theoretical affiliations – functionalists, Marxists, and so on – with a particular emphasis on related issues of Third World or hinterland underdevelopment. Concrete case studies of gift exchange, conspicuous consumption, slavery, kin-based economies, etc., are examined in a variety of geographical and historical contexts.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Anthropology 54.334★

Culture and Symbols

The ability to create and manipulate symbols and concrete images ranging from colours to sounds and from animals and plants to deities is a defining characteristic of cultural reality. Different anthropological methods are employed to examine symbols in all parts of the world and in a variety of social contexts, such as magical and religious rituals, mythology, folklore, art, primitive classification, kinship and politics. The focus is on how human beings understand themselves through symbols and on alternative approaches to symbolic studies.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Anthropology 54.335★

The Prehistory of Human Settlement

This course examines the way in which human societies with different ways of life utilize space. Archaeological data are used to compare and contrast the settlement forms of hunting and gathering peoples with those of more settled village and urban dwellers. This course considers in detail the emergence in both the Old and New Worlds of settled life and the resulting changes in human-environment relations.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Anthropology 54.336★

Medical Anthropology

An examination of the cross-cultural literature on approaches, institutions and techniques of healing. This includes the study of cultural and biological factors in the causation, diagnosis, treatment and meaning of disease. Methods in cross-cultural epidemiology and ethnographic field procedures are discussed, as is the role of symbolism and ritual in healing traditions. Additional topics include transcultural psychiatry, ethno-pharmacology, midwifery, paleopathology, health care delivery in developing countries.

Precludes additional credit for Sociology-Anthropology 56.325★ taken in the Fall of 1987.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.339★

Society and Shelter

An examination of buildings and shelter as human and social products. Major areas of concern include the impact of the built environment on social processes, the perception and cognition of the built environment, the design, construction and use of buildings as social processes, the development of the design professions, and the distribution of shelter as part of social stratification. (Also listed as Architecture 76.423★.)

Precludes additional credit for Sociology 53.338 taken prior to 1984-85.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.345★**Stratification and Mobility**

An examination of the principal theoretical and empirical questions in the study of social class and social mobility in complex societies. The bases and forms of inequality are examined with the aid of data from Canada, England, the United States, the Soviet Union, China, Japan and a number of other societies.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.346★**Industrial Sociology**

An enquiry into the development, structure and prospects of industrial society and post-industrial society, including the relation of industrial institutions to the rest of society, and the internal organization of industrial institutions, including problems of management, labour and union relations.

Precludes additional credit for Sociology 53.246★ (no longer offered).

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.347★**Power**

The principal concern of the course is the nature of power in human groups – its sources, forms and processes. Particular attention is paid to community and national elites and power structures.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.348★**Collective Behaviour and Social Movements**

An enquiry into the process of collective action as part of social change at various levels. Topics discussed include crowds, fashions, labour, political and religious movements, rebellion and revolution.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.350★**Political Behaviour**

An examination of sociological contributions to the study of political behaviour and of the relations between politics and the social structure, both in Canada and in other societies. Emphasis is placed upon political socialization, the class basis of politics, conflict, mass movements and change.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.351★**Methods of Population Analysis**

An introduction to demographic techniques. Problems in the collection and analysis of population data, such as population censuses and vital registration. Emphasis is placed upon the application of "demographic" methods (e.g., cohort analysis) to other areas of sociological investigation.

Prerequisite: One of Sociology 53.100, Anthropology

54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.355**Bureaucracy and Society**

An examination of the origins and development of large-scale bureaucratic structures in the industrialized nations. Particular attention is given to a critical evaluation of the bureaucratic thesis, namely that bureaucracy operating in the context of large-scale complex organizations is the distinguishing characteristic and ultimate basis of power in contemporary societies. This is accomplished by means of a detailed study of bureaucratic structures and processes in the modern business enterprise, the state and other public and private organizations.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology-Anthropology 56.358**Conflict and Conflict Resolution**

A comparative analysis of the structure of social and inter-cultural conflict. Methods for conflict management and resolution are examined with particular reference to mediation, bargaining and negotiation theories. Students are expected to participate in simulation exercises.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology-Anthropology 56.360**Development and Social Change**

An enquiry into central theoretical debates pertaining to issues of underdevelopment, modernization, dependence, exploitation and world system formation. Emphasis is placed on the general effects of industrialism and capitalism on the contemporary history of Third World societies. Consideration is given to concrete case studies from across the world.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.370**Research Design and Data Analysis**

An integrated approach to the problems involved in the analysis of quantitative data. Research design and procedure and statistical inference are studied. It is recommended that Sociology Honours students take this course in the Third year of study, prior to commencing work on their Honours Essay.

Precludes additional credit for Economics 43.220 and Psychology 49.300.

Prerequisites: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent and in addition, Sociology 53.203 or Anthropology 54.203 or equivalent in other departments; or permission of the Department.

Lectures and workshop four hours a week.

Sociology 53.373★**Criminal Justice Policy**

A description of Canadian criminal justice administration, including prison, parole, probation and community treatment, with an emphasis on conflicting ideologies and the dynamics of policy-making decisions. Consideration is given to the relationship between criminal justice policy and

other aspects of social change.

Prerequisites: Sociology 53.255★, 53.271★ (53.270 prior to 1988-89) and Third-year standing, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.375★

Medical Sociology

A study of social factors related to health and illness, the illness role, relationships between patients and health practitioners, and the organization of health services. Attention is given to both the social psychology of health and illness and the structure of organizations concerned with health care.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.377★

Sociology of Welfare Institutions

A study of the emergence and position of welfare institutions in contemporary society with special emphasis on their relationship to social change, ideological conflicts and forms of organization.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.380

Social Policy

A study of social policy in relation to social change and issues in Canadian society. This involves the policy orientation and role of the social sciences, especially sociology, in assessing the socio-cultural background, the processes and the consequences of social policy. Contemporary Canadian issues are considered as case studies in social policy.

Prerequisites: Introductory Sociology or Anthropology and at least one additional 200- or 300-level credit in Sociology, or equivalent courses in related disciplines, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.381★

Sociology of Law

This course offers an introduction to and overview of the sociology of law. The development of sociology of law is located in sociology's wider concerns with the distinctive features of modernity, the West and capitalism. These themes are explored through the writings on law of Durkheim (changing forms of social solidarity, rise of restitutive law, contract), Weber (formal rationality, legal rationalization, economic calculation) and Marx (law, state and coercion, legal form/commodity form). The course outlines the way in which these themes have influenced the subsequent development of the sociology of law. (Also listed as Law 51.316★.)

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Anthropology 54.382★

Anthropology and Science Fiction

This course explores the fundamental principles of anthropology through the medium of science fiction. There are points of convergence between the literature of anthropology and the literature of science fiction, and these are explored. Topics to be covered include: order in an

anarchic social field, gender and identity, the evolution of brain and consciousness, religions and symbolic systems, and the future of human societies.

Precludes additional credit for Sociology-Anthropology 56.285★ taken with the topic *Anthropology through Science Fiction*.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100 or equivalent, or permission of the Department.

Lectures and discussion three hours a week.

Sociology-Anthropology 56.383★

The Anthropology of Art I

This course considers anthropological approaches to the study of art. The focus is on art in small-scale, non-industrialized societies and on the art of tribal peoples who have been colonized (so-called "Fourth World" art). Topics include the economic, social, political and symbolic roles of art in social processes. Attention is given to issues of identifying and defining art forms and activities cross-culturally, and to the methods required to study and compare differing aesthetic systems.

Precludes additional credit for Sociology-Anthropology 56.285★ or 56.325★ taken with the same topic.

Prerequisite: One of Sociology 53.100, Anthropology 54.100, Sociology-Anthropology 56.100, or an introductory course in Art History, or permission of the Department.

Lectures and discussion three hours a week.

Sociology-Anthropology 56.384★

The Anthropology of Art II

This course applies anthropological methods and theories to the analysis of the art of selected non-Western and Fourth World societies. Case materials are drawn from selected societies.

Precludes additional credit for Sociology-Anthropology 56.286★ or 56.326★ taken with the same topic.

Prerequisite: Sociology-Anthropology 56.285★ or 56.325★ or 56.383★, The Anthropology of Art I, or permission of the Department.

Lectures and discussion three hours a week.

Sociology 53.386★

Field Placement: Criminology and Criminal Justice Concentration

Experience in an agency setting, which provides the basis for translating the academic dimension into practical involvement in various aspects of criminal justice. This course is graded on a satisfactory/unsatisfactory basis. There is no supplemental examination in this course.

Prerequisite: Open only to those students formally admitted to and registered in the Criminology and Criminal Justice concentration.

Fall and Winter terms.

Sociology 53.388★

An Examination of Current Issues in Criminal Justice

This course focuses on conflicting goals among components of the criminal justice system, the theory and practice of correctional institutions and their alternatives, and offenders' rights.

Prerequisites: Sociology 53.255★, 53.271★ (53.270 prior to 1988-89) and Third-year standing, or permission of the Department.

Lectures and discussion three hours a week.

Sociology-Anthropology 56.391★ and 56.392★

Course-Related Tutorials

See explanatory note on p. 243.

Sociology 53.400★**Field Placement: Research and Analysis**

Students in this placement gain research experience in a professional research setting. Instead of attending classes, students spend up to one day a week participating in the research of an organization. In return, students receive a half credit and are allowed to draw upon this research in their Honours Essay. Students prepare a short assessment of their placement experience. Enrolment is limited. Placement is based on selection criteria and is done by the Honours Sociology Co-ordinator. Interested students should consult with the Honours Sociology Co-ordinator. Prerequisites: Final-year Honours Sociology standing, Sociology 53.370, and permission of the Department.

Anthropology 54.400★**Field Placement In Anthropology**

Students in this placement gain research experience in a professional research setting. Instead of attending classes, students spend up to one day a week participating in the research of an organization. In return, students receive a half credit and are allowed to draw upon this research in their Honours Essay. Students prepare a short assessment of their placement experience. Interested students should consult with the Honours Anthropology Co-ordinator. Prerequisites: Final-year Honours Anthropology standing and permission of the Department.

Anthropology 54.410**The Ethnographic Enterprise**

An examination of the premises underlying particular cases of empirical work in anthropology. The value of various anthropological paradigms for the solution of standard ethnographic problems.

Prerequisite: Final-year Honours standing or permission of the Department.

Seminar two hours a week.

Sociology-Anthropology 56.430★**Communication Policy: Theory and Foundations**

This course examines theoretical perspectives on the role and context of communication and cultural policy in modern Canadian society. It introduces students to basic concepts necessary to explain the role of the State in capitalist society. It explores alternative frameworks for understanding the production and legitimization of communication and cultural policy as a type of State action. (Also listed as Mass Communication 27.430★.)

Precludes additional credit for Sociology-Anthropology 56.431 or Mass Communication 27.431, no longer offered, and Sociology-Anthropology 56.411 or Mass Communication 27.411, taken prior to 1986-87.

Prerequisites: Final-year Honours standing and Sociology-Anthropology 56.311 or Mass Communication 27.311, or permission of the Department.

Seminar three hours a week.

Sociology-Anthropology 56.432★**Communication Policy: Institutions and Practices**

This course examines concrete examples of selected policy practices in the communication and cultural policy field and relates them to the institutions, agencies, actors, and social interests shaping the policy formation process in Canada. (Also listed as Mass Communication 27.432★.)

Precludes additional credit for Sociology-Anthropology 56.431 or Mass Communication 27.431, no longer offered, and Sociology-Anthropology 56.411 or Mass Communication 27.411 taken prior to 1986-87.

Prerequisites: Final-year Honours standing and Sociology-

Anthropology 56.430★ or Mass Communication 27.430★, or permission of the Department.

Seminar three hours a week.

Sociology 53.433★**Law in Advanced Capitalist Society**

The course examines the different ways in which sociological and legal theory has attempted to grasp and understand the changing role and function of law in modern society, with particular reference to advanced capitalist societies. Topics include: the welfare state and the use of regulatory law; juridification and legalization; counter-trends: deregulation, informalism, legal pluralism. (Also listed as Law 51.417★.)

Prerequisite: Final-year Honours standing or permission of the Department.

Seminar three hours a week.

Sociology 53.443★**Selected Problems in the Uses of Sociology and Social Policy Analysis**

An examination of selected problems in the relation between sociology as a discipline and the uses to which it may be put. Depending on the interests of the instructor, these may include: social criticism, social intervention, social policy and social planning, social engineering, systems analysis and action research.

Prerequisite: Final-year Honours standing or permission of the Department.

Seminar two hours a week.

Sociology 53.450★**Advanced Research Methodology**

A study of specific methodological topics in social research. Among the topics that may be included are: secondary data analysis, elite interviewing, observational techniques, social indicators, and evaluation research.

Prerequisite: Final-year Honours standing or permission of the Department.

Seminar two hours a week.

Note:

The following courses, Sociology 53.451★-56.458★, are workshops organized either around a specific research topic or around some policy or interventionist issue. The content is expected to vary from year to year reflecting the current research interests of the instructor. When a workshop is offered, a detailed description will be available. In general, specific area workshops are unlikely to be offered more than once in any two-year period.

Sociology 53.451★**Workshop in Demography/Human Ecology**

A research- and/or policy-oriented seminar that uses census data or other secondary sources to examine topics in Canadian population, technological development, migration or resource use, depending on the research interests of the instructor.

Prerequisite: Final-year Honours standing or permission of the Department.

Seminar two hours a week.

Sociology 53.452★**Workshop on Work and Organizations**

A research-oriented seminar that, depending on the research interests of the instructor, may examine the occupational distribution in Canada, ethnicity, gender and work, occupational choice, trade unions, professional organizations, the professions or bureaucracy.

Prerequisite: Final-year Honours standing or permission of the Department.
Seminar two hours a week.

Sociology 53.453★

Workshop in Criminology/Deviance

A seminar that, depending on the research interests of the instructor, may consider crime, criminal justice, social processes relating to the implementation of criminal justice policy, or other aspects of criminality or deviance.

Prerequisite: Final-year Honours standing or permission of the Department.
Seminar two hours a week.

Sociology 53.454★

Workshop on Sociology of Education

A research- or policy-oriented seminar that, depending on the research interests of the instructor, may examine teacher expectancy effects, student culture, barriers to equality of access or other substantive issues.

Prerequisite: Final-year Honours standing or permission of the Department.
Seminar two hours a week.

Sociology 53.455★

Workshop on Stratification and Mobility

A research-oriented seminar that, depending on the research interests of the instructor, may examine differentiation over time or comparatively, patterns of inheritance mobility, or the effects of ethnicity, of gender and of past education on returns to education.

Prerequisite: Final-year Honours standing or permission of the Department.
Seminar two hours a week.

Sociology 53.456★

Workshop in Urban Sociology

A research-oriented seminar examining aspects of the Ottawa area. These may include patterns of urban growth and change, residential and urban-rural mobility, depending on the research interests of the instructor.

Prerequisite: Final-year Honours standing or permission of the Department.
Seminar two hours a week.

Sociology 53.457★

Workshop in Social Psychology

A research-oriented seminar that, depending on the research interests of the instructor, may focus on one or more of the following topics: attribution theory, cognitive social psychology, conformity, ethno-methodology, psychoanalysis or victimology.

Prerequisite: Final-year Honours standing or permission of the Department.
Seminar two hours a week.

Sociology-Anthropology 56.458★

Workshop in Political Sociology-Anthropology

A research-oriented seminar that, depending on the research interests of the instructor, may examine voting behaviour, political movements and parties, national and community elites, relations between society and the state, the prehistoric state, and social conflict.

Prerequisite: Final-year Honours standing or permission of the Department.
Seminar two hours a week.

Sociology-Anthropology 56.460★

Studies in Applied Semiology

A critical examination of different approaches to the relationship between culture and signs broadly defined,

with an emphasis on the concrete workings of symbolism and language from within themselves as well as in the historical context of special cultural environments. "Scripts" taken from different sources – the scriptures, myths, folk narratives, modern literature and art, the media, pornography, children's drawings – are analyzed with a view to illustrating conflicting views on the nature of language.

Precludes additional credit for Anthropology 54.475★ taken with the same topic.

Prerequisite: Final-year Honours standing or permission of the Department.
Seminar two hours a week.

Sociology-Anthropology 56.465★

Selected Problems in the Study of Ethnic and Race Relations

This seminar is designed to explore the social, political, economic and ideological relevance of ethnicity and "race" in Canada and other Western societies. It examines the efficacy of several theoretical frameworks in elucidating issues such as ethnic inequality, aboriginal rights, racism, ethnic mobilization, and the position of immigrant and minority women.

Prerequisite: Final-year Honours standing or permission of the Department.
Seminar two hours a week.

Anthropology 54.470★

Selected Problems in the Study of North American Native Peoples

This is an advanced seminar course for the in-depth study and discussion of North American native peoples. Attention is given to both change and persistence in social and cultural patterns through time, as well as to the contemporary conditions under which native people live. Emphasis is placed on Canadian Indians, Inuit and Métis, and their position in the wider society. Students undertake a critical research project.

Prerequisite: Final-year Honours standing or permission of the Department.
Seminar two hours a week.

Anthropology 54.475★

Contemporary Problems in Anthropology

Selected problems in anthropology, not ordinarily treated in the regular course program. The choice of topics varies from year to year. Topic for 1990-91: *Gender, Ethnicity and Race (as Descriptive Bases of Inequality)*. This course critically examines systems of inequality and the manner in which gender, ethnicity and race are utilized as inescapable symbols of discriminatory treatment in social, economic and political relations.

Prerequisite: Final-year Honours standing or permission of the Department.
Seminar two hours a week.

Anthropology 54.476★

Contemporary Problems in Anthropology

Selected problems in anthropology, not ordinarily treated in the regular course program. The choice of topics varies from year to year.

Sociology 53.480★

Men's Studies

A historical orientation to men in society focusing on changes under conditions of late capitalism; an analysis of the social construction of accepted definitions of masculinity and of appropriate male role behaviour in work, marital, parenting, and other social contexts; an examination of changing power relations between men and women, men and their children, and among men in particular social

contexts; an investigation into issues of legal equality for men, and an exploration of the politics and processes of men's movements.

Precludes additional credit for Sociology 53.485★ taken with the same topic.

Prerequisite: Fourth-year Honours or graduate standing, or permission of the Department.

Seminar two hours a week.

Sociology 53.485★

Contemporary Problems in Sociology

Selected problems in sociology, not ordinarily treated in the regular course program. The choice of topics varies from year to year. Topic for 1990-91: *Sexuality and Reproduction in Feminist Theory*. A broad overview of the feminist literature on sexual and reproductive regulation, together with the attempts by past and present women's movements to contest such regulation. The seminar explores the significance of sexual and reproductive regulation to the subordination of women, with particular emphasis being placed on the importance of class- and race-sensitive theory. The area focus is mainly Canada. Discussion includes the public health system as a site of sexual regulation, sexuality in the formation of nationalisms, the sexual politics of First and Second Wave feminism, the tension between feminism and Michel Foucault's work. The course concludes with a section on the contemporary crisis of the Canadian federal state with respect to sexual and reproductive regulation.

Prerequisite: Final-year Honours standing or permission of the Department.

Seminar two hours a week.

Sociology 53.486★

Contemporary Problems in Sociology

Selected problems in sociology, not ordinarily treated in the regular course program. The choice of topics varies from year to year.

Sociology 53.491★ and 53.492★

Anthropology 54.491★ and 54.492★

Tutorial in Sociology or Anthropology

See explanatory note, p. 243.

Sociology 53.495, Anthropology 54.495

Honours Practicum

At the end of their final year, Honours candidates are required to present a major research essay. For Honours students in Anthropology, and for those Honours students in Sociology who choose this option, this requirement is met through the Practicum. Students present their essay proposals for discussion and criticism to fellow students and faculty, and report periodically upon the paper's progress. Common problems of conceptualization, research design, analysis and interpretation are taken up for consideration.

Prerequisite: Permission of the Department.

Sociology 53.498

Honours Essay

At the end of their final year, Honours candidates are required to present a major research essay. In this course, students work independently with a faculty adviser. It is also strongly recommended that students attend the workshops offered in Sociology 53.495. Prior to registration students must consult the Co-ordinator of Honours (Sociology) and be assigned a supervisor.

Prerequisite: Permission of the Department.

Graduate Courses

Final-year Honours students are encouraged to take one or more graduate seminars, which are available to them with the permission of the Department. A variety of theoretical, substantive and methodological courses are available. Specific details are contained in the 1990-91 Calendar of the Faculty of Graduate Studies and Research.

Courses Planned for Summer School and Fall-Winter Evening Division

Summer

At least one introductory course (Sociology 53.100 or Anthropology 54.100) will be given every Summer in the Evening division.

One of the methodology courses (Sociology 53.203 or Anthropology 54.203) and one of the theory courses (Sociology-Anthropology 56.305 or Sociology 53.306) are also offered every Summer. Other offerings will depend upon departmental capabilities and student interest and demand. A variety of types and levels of courses will be offered each year.

Fall-Winter Session Evening Division

The introductory courses Sociology 53.100 and Anthropology 54.100 are offered every year in one or more sections. Sociology 53.203 and either Sociology-Anthropology 56.305 or Sociology 53.306 are also given in the Evening division.

Paterson Hall, Room 459
Telephone: 788-2886

Members of the Institute

Director

C. Jacobsen, Co-ordinator of Programs

Honours Adviser

Carl H. McMillan

Associated Members of the Faculty

Glynn R. Barratt (*Russian*)
J.L. Black (*History*)
B. Bociurkiw (*Political Science*)
R. Carson (*Economics*)
R. Carter Elwood (*History*)
C. Jacobsen (*Political Science*)
D. le Berruier (*Art History*)
Angelina Lewinson (*Russian*)
B. Mandell (*International Affairs*)
L. Maximenkov (*Russian*)
C. McMillan (*Economics*)
G. Melnikoff (*Russian*)
J. Neuspiel (*Law*)
G. Ozornoy (*Geography/Russian*)
A. Podgorecki (*Sociology*)
T. Rakowska-Harmstone (*Political Science*)
G. Roseme (*Political Science*)
R. Selucky (*Political Science*)
L. Strickland (*Psychology*)
J. Strong (*History*)
W. Thorngate (*Psychology*)
P. Varnai (*Russian*)

Adjunct Members

M. Carley (*History*)
A. Kagedan (*Soviet Studies*)
T. Kaminski (*Ottawa*)
M. Los (*University of Ottawa*)
M. Selucka (*Law*)
M. Opalski (*Soviet Studies*)
P. Roberts (*Ottawa*)

General Information

A Committee on Soviet and East European Studies was formed in 1963 to foster interdisciplinary studies, research, conferences and publications in this area. The Committee was transformed into the Institute of Soviet and East European Studies in 1970. Faculty members from ten disciplines (Art History, Criminology, Economics, Geography, History, Law, Political Science, Psychology, Russian and Sociology) participate in the Institute's programs. They are joined on an occasional basis by visiting scholars (including visitors from the U.S.S.R. and Eastern Europe).

On the undergraduate level, the Institute offers an interdisciplinary Bachelor of Arts (Honours) program in Soviet and East European Studies. The Institute also administers a program of interdisciplinary studies leading to a Master of Arts degree in Soviet and East European Studies, the only one of its kind in Canada. The curricula for both programs are offered largely through participating departments. Students in the Institute's programs are eligible to apply, under the academic exchange agreement between Carleton and the Leningrad State University, for ten months of study in

the Soviet Union. A similar exchange agreement exists with the University of Warsaw; and an agreement with the International Cultural Institute in Budapest provides for graduate studies at post-secondary institutions in Hungary. Students participating in the Institute's programs have at their disposal a specialized periodicals reading room in the Institute, the University library's collection of books, documents, periodicals and micro-materials on the Soviet Union and Eastern Europe and the extensive holdings of the National Library and other specialized libraries in Ottawa. As of the Fall term, 1987, the Institute had a system in place for viewing live Soviet television.

Each year the Institute organizes a series of public seminars and lectures by invited specialists from outside the University, on a broad range of topics bearing on the Soviet Union and Eastern Europe. The Institute also sponsors frequent conferences and colloquia and promotes extension courses in the area. The Institute maintains organized research programs in several broad areas: East-West relations (with emphasis on their economic, trade, and military-strategic aspects), nationality and minority issues, and aspects of Canadian-Soviet relations. The Institute issues a regular series of working papers and special studies, a Bibliographical Series on the U.S.S.R. and Eastern Europe, and has sponsored ten volumes in the Carleton Library Series in Soviet and East European Studies.

Because of its interdisciplinary character, a degree in Soviet and East European studies provides a useful basis for a career in government service either at home or abroad. The expansion of East-West economic relations has increased the demand for area specialists in the business and financial communities. A new emphasis on regional studies and international relations at the secondary-school level makes this program attractive to school boards. For many students, studies in Soviet and East European affairs constitute a convenient first step to more specialized professional or academic training.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all regulations and requirements of the Institute, as set out below.

Honours Program

The objective of the Honours program is to equip students with indispensable linguistic tools and to provide, through an interdisciplinary approach, an integrated knowledge of the cultures, historical developments and contemporary social, economic and political systems of the area. The program leads to the degree of Bachelor of Arts with Honours in Soviet and East European Studies.

Combined Honours Program

A Combined Honours degree between Soviet and East European Studies and the School of Journalism is offered to interested students.

Course requirements for this degree are planned by the Director of the Institute in consultation with the Director of the School of Journalism, and are designed to accommodate the students' interests and needs.

Combined Honours programs are also possible in conjunc-

tion with other disciplines and are governed by the regulations of the departments concerned.

Further details on these programs may be obtained from the Institute.

Admission Requirements

Admission to the program must be approved by the Institute of Soviet and East European Studies and by the Faculty of Social Sciences Committee on Honours. Students with at least a 65 percent average in Senior Matriculation or a C standing in the Carleton Qualifying-University year may be enrolled in the program in the First year. With the consent of the Institute, students may also enter the program in subsequent years provided they have maintained Honours standing and have completed the program's course requirements to that point.

Course Requirements

A total of 20 credits is required for the Honours B.A. in Soviet and East European Studies.

All candidates normally are required to take three credits in the Russian language beyond the introductory level: Russian 36.202 (Intermediate), 36.203 (Grammar), and 36.302 (Advanced). If students wish to take further Russian language courses, Russian 36.303 (Translation) or 36.320★ and 36.321★ (Applied) are advised. Russian 36.120 may be substituted for 36.100 and 36.202. Students normally are expected to complete their language requirements by the end of their Third year. Other Russian and Eastern European language and literature courses may be selected as additional components of the candidate's Honours program (see below).

In the First year, courses must be chosen, in consultation with the Honours Adviser, from the 100 level, or from higher-level courses open to First-year students. These courses should be selected as preparation for more specialized Soviet and East European area courses offered in various disciplines. Introductory courses in economics, European history and political science (as well as other introductory courses in the social sciences) therefore normally are taken at this stage.

In the following three years, candidates must select eight additional credits (representing no less than three different disciplines) from the area-related courses offered by participating departments and listed below. The following three courses are regarded as forming the core of the Institute's undergraduate area studies program: Economics 43.371★ and 43.372★ (covering the Soviet and East European economies), History 24.260 (Russian and Soviet History) or 24.360 (Soviet History), and Political Science 47.320 (Soviet Government and Politics) and all three are strongly recommended to all candidates for the degree. One of these eight courses must be either Soviet Studies 55.498 (Honours Essay) or an SEES-approved Fourth-year seminar given by the Institute or by one of the participating departments.

Four additional credits are to be selected, in consultation with either the Honours Adviser or the Director.

Courses Offered by Participating Departments

Art History

- 11.221★ Eastern Medieval Art
- 11.422★ Topics in Eastern Medieval Art

Russian

- 36.120 Intensive Russian

- 36.201★ Russian Conversation
- 36.203 Russian Grammar
- 36.202 Advanced Russian
- 36.211 Intensive Introductory Russian
- 36.260 Russian Literature in English Translation — Nineteenth and Twentieth Centuries
- 36.291★ Twentieth-Century East-European Literature in English Translation
- 36.301★ Advanced Russian Conversation
- 36.302 Advanced Russian
- 36.303 Russian Translation
- 36.304 Russian Style and Composition
- 36.320★ Applied Russian
- 36.321★ Applied Russian
- 36.335 Major Authors: Pushkin to Chekhov
- 36.355 Major Authors: Gorky to Solzhenitsyn
- 36.360★ Special Topic: Dostoevsky to Chekhov (in English Translation)
- 36.361★ Special Topic: The Revolution and After (in English Translation)
- 36.390 Slavic Language Tutorial
- 36.399 Introduction to Methods of Research
- 36.405 Tutorial: History of the Russian Language
- 36.435★ Tutorial: Special Topic (Literature)
- 36.445★ Tutorial: Special Topic (Drama)
- 36.455 Tutorial: Special Topic (Post-1917 Period)
- 36.493★ Translation Tutorial I
- 36.494★ Translation Tutorial II

Slavic Languages

- 36.390 Slavic Language Tutorial

German

- 22.255★ Literature of the German Democratic Republic
- 22.260★ Bertolt Brecht
- 22.401★ Formal German Speech
- (These courses are conducted in German)

Geography

- 45.360★ Soviet Union
- 45.361★ East Europe
- 45.570★ Problems in Arctic and Subarctic Environments

History

- 24.260 History of Russia and the U.S.S.R.
- 24.359★ Habsburg Monarchy 1526-1918
- 24.360 History of the U.S.S.R.
- 24.361★ The Russian Empire
- 24.365★ The Soviet Union in International Affairs from Comintern to Cold War
- 24.366★ Modern East Central Europe
- 24.460 Selected Problems in Russian History
- 24.461 Selected Problems in Soviet History
- 24.560 Revolutionary Russia, 1898-1921
- 24.589 Historiography (section dealing with Modern Russia)

Economics

- 43.365★ The Economics of Planning
- 43.371★ Socialist Economic Systems: The Soviet Model
- 43.372★ Socialist Economic Systems: Eastern European Variants
- 43.486★ Comparative Economic Systems I
- 43.487★ Comparative Economic Systems II
- 43.536★ Comparative Economic Systems I
- 43.537★ Comparative Economic Systems II

Law

- 51.420★ Advanced International Economic Law
- 51.463 Public International Law

- 51.488 Socialist Legal Systems
51.563 Socialist Legal Systems

Philosophy

- 32.220 Introduction to Marxist Philosophy

Political Science

- 47.314 Eastern European Politics
47.316★ Revolution
47.320 Soviet Government and Politics
47.330★ Politics and Literature
47.431★ Marxist Thought
47.432★ Contemporary Marxism
47.461★ Soviet Foreign Policy
47.514★ Comparative Communist Politics: Theory and Practice
47.515★ Comparative Communist Politics: Selected Aspects
47.516★ Selected Problems in Soviet Politics
47.521★ Strategy and Security
47.586★ Strategy (with permission)

International Affairs

- 46.520★ Strategy and Security
46.535★ Political Economy of East-West Relations
46.538★ International Economics: Policy and Theory
46.582★ Political Economy of East-West Relations
46.583★ Integration in Eastern Europe

Sociology

- 53.345★ Stratification and Mobility
53.545★ Power and Stratification
53.584★ Modern Marxist Theory

Soviet Studies

- 55.400★ Aspects of Eastern Europe
55.401★ Aspects of Eastern Europe
55.402★ Soviet Power: Strategy and Doctrine
55.490 Tutorial in Soviet and East European Studies
55.491★ Tutorial in Soviet and East European Studies
55.492★ Tutorial in Soviet and East European Studies
55.500★ Interdisciplinary Seminar on the Soviet Union and Eastern Europe
55.501★ Interdisciplinary Seminar on the Soviet Union and Eastern Europe

Technology, Society, Environment Studies

- 59.404★ Technology and Society: The Arms Race

Note:

Not all of the foregoing courses are offered in any given year, and not all combinations of courses are possible. See departmental listings for further details.

Academic Standing

Students must maintain Honours standing as prescribed by the general requirements of the Faculty of Social Sciences.

Graduate Program

The Institute offers an interdisciplinary Master of Arts program in Soviet and East European Studies with the participation of faculty from the Departments of Economics, Geography, History, International Affairs, Law, Political Science, Russian and Sociology, as well as invited specialists from other universities and visiting scholars from the U.S.S.R. and Eastern Europe. It is designed for students wishing to acquire specialized knowledge of the

Soviet and East European area, including proficiency in Russian, before proceeding towards a doctoral degree in one of the disciplines represented in the program, either at Carleton or another university. The program is also suitable for students aspiring to a professional, business or government career which requires knowledge of the area. For details, consult the Graduate Studies and Research Calendar.

Courses Offered

Soviet Studies 55.400★

Aspects of Eastern Europe

An interdisciplinary seminar in aspects of the study of Eastern Europe with specific content dependent on the current emphasis and resources of the program of the Institute. Recommended for Institute of Soviet and East European Studies Honours students.

Soviet Studies 55.401★

Aspects of Eastern Europe

See description of Soviet Studies 55.400★.

Soviet Studies 55.402★

Aspects of Eastern Europe

See description of Soviet Studies 55.400★.

Not offered 1988-89.

Soviet Studies 55.490

Tutorial in Soviet and East European Studies

Tutorials or reading courses on selected topics may be arranged with the permission of the Institute and agreement of the instructor.

Prerequisite: Permission of the Institute.

Soviet Studies 55.491★

Tutorial in Soviet and East European Studies

Tutorials or reading courses on selected topics may be arranged with the permission of the Institute and agreement of the instructor.

Prerequisite: Permission of the Institute.

Soviet Studies 55.492★

Tutorial in Soviet and East European Studies

Tutorials or reading courses on selected topics may be arranged with the permission of the Institute and agreement of the instructor.

Prerequisite: Permission of the Institute.

Soviet Studies 55.498

Honours Essay

Open to students in their Fourth year who have maintained a B+ average in Soviet Studies courses and who have received the permission of the Institute. The subject of the research will be selected in consultation with the Institute and a supervisor will be assigned. An oral defence of the essay is required.

Soviet Studies 55.500★

Interdisciplinary Seminar on the Soviet Union and Eastern Europe

Prerequisite: Permission of the Institute.

Fall term.

Soviet Studies 55.501★

Interdisciplinary Seminar on the Soviet Union and Eastern Europe

Prerequisite: Permission of the Institute.

Winter term.

Dunton Tower, Room 1419
Telephone: 788-2109

Officers of Instruction

Chairman

C.A. Marsden

Assistant Chairman

J. Jurado

Supervisors of Language Courses

M.A. Giella

J.M. López-Saiz

Supervisor of Honours and Pass Studies

R. Larson

Supervisor of Graduate Studies

R.L. Jackson

Director of Winter Program Abroad

M.A. Giella

Professors

F.J. Hernández

R.L. Jackson

J. Jurado

Associate Professors

F. Atienza

R. Larson

A. Lozano

C.A. Marsden

P.J. Roster, Jr.

Assistant Professors

M.A. Giella

J.M. López-Saiz

General Information

The Department of Spanish offers both Pass and Honours programs. Classes are generally conducted in Spanish, and laboratory instruction, an integral part of courses at the introductory and intermediate levels, is also available to students in the more advanced language courses.

The Department offers introductory Portuguese when there is a sufficient number of interested students.

Lists of prescribed texts and supplementary reading for all courses are available from the Secretary of the department.

Students are encouraged to take advantage of the favourable atmosphere for informal practice of the language provided by La Sociedad Hispánica (Hispanic Society).

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 65-66), in addition to all departmental regulations and requirements as set out below.

Acceleration and intensive Spanish

Students who are beginning the study of Spanish at university, and who are considering Spanish as a Major, should take note of Spanish 38.120 Intensive Introductory Spanish (two credits), 38.151 Intensive Intermediate Spanish, designed specifically for potential Majors, and the Intensive Spanish program, a year which includes a term abroad, devoted exclusively to the study of Spanish (see below).

Summer Session and Evening Offerings

The Department normally offers language courses (Spanish 38.115, 38.150, 38.201★, 38.202★, 38.301★, 38.302★) through the 300 level in both Day and Evening divisions during the year (38.115 Summer session). In addition, the Department offers Spanish 38.210★ and 38.211★ every other year in the Evening division and has as well a system of rotation that ensures the offering of a different literature course at the 300, 400 and 500 levels each year in the Evening.

Intensive Spanish Program and Winter Program Abroad

The Intensive Spanish program is a year devoted exclusively to the study of Spanish. The program is divided into Fall term and Winter term. Students may enrol in either of the two terms or in both. This program will not be offered in the event of insufficient enrolment.

Fall Term: Language Acquisition

The Fall term of the Intensive Spanish program, offered at Carleton, is designed to provide a maximum of acceleration in language acquisition to well-motivated students with little or no previous training in Spanish. While intended for the beginning student, the program is flexible enough to accommodate students who already have a grade of at least C+ in Grade 13 Spanish or in Spanish 38.115 or the equivalent. Such students may audit the introductory unit (Spanish 38.115) of the program but may receive only an additional one and a half credits upon successful completion of the Fall term.

The full Fall term covers the following courses:

Spanish

38.115 Introductory Spanish

38.150 Intermediate Spanish

38.201★ Spanish Conversation

Students may enrol in any course unit of this program for equivalent credit. Similarly, they may withdraw from the program, in exceptional cases, after each unit, receiving equivalent credit after successful examination for work done.

This program entails 15 hours of class a week plus language laboratory instruction and practice for a total of up to two and a half credits.

During the Fall term students are charged with the responsibility of spending, together with the other members of the program, as much time as possible outside the classroom under the guidance of a "group leader" (a senior student in Spanish), who will encourage them to practise whatever material they are being exposed to in class, and who will organize drill sessions and other activities for the purpose of reinforcing what the students are learning during regular classroom hours. After successful completion of the Fall term, students have the option of joining the Winter term of

the Intensive Spanish program or enrolling in up to two and a half credits in the subjects of their choice.

Winter Term: Language and Civilization

During the Winter term the program is held in a Spanish-speaking country, where students continue their studies by taking another two and a half compressed credits in Spanish.

Courses available abroad are:

Spanish

- 38.202★ Spanish Composition
- 38.210★ Spanish Civilization
- 38.211★ Spanish American Civilization
- 38.301★ Advanced Spanish Conversation
- 38.302★ Advanced Spanish Composition

The program requires 15 class hours a week plus regular field trips. Attendance is compulsory, subject to the usual exceptions.

The cost of the program, including university fees and room and board, is about the same as the cost of a similar period of full-time study spent at Carleton, plus air fare. Financial assistance is available in the form of the Sara Helen Parry Hughes Travel Award. For terms see Awards and Financial Assistance section of this Calendar.

Admission Requirements

Admission to the Winter Program Abroad (Winter term) is limited to students who have (a) completed the Intensive Spanish program, Fall term; or (b) have a credit in an intermediate-level Spanish course and Spanish 38.201★ or the equivalent.

Second- or Third-year Spanish Majors who wish to take only this second half of the program are advised to take Spanish 38.201★, and four other half credits from those available in other disciplines during the Fall term. Non-Majors wishing to enrol in the program should consult not only the Department of Spanish concerning the program, but also their Major departments (chosen or intended) to arrange a Major program that will permit the necessary absence from Ottawa.

Interested students should apply to Professor M.A. Giella, Director of the Winter Program Abroad, (Winter term), Spanish Department, preferably not later than October 15, 1990.

Pass Programs

Interested students must consult the Department as early as possible to plan their program. General requirements are as laid down on pp. 59-64 of the Calendar. A Pass program in Spanish normally consists of five credits after Spanish 38.150, 38.151, or 38.120; Spanish 38.210★ and 38.211★ are compulsory, and three literature credits at the 300 level must be taken. A Combined Pass program consists of four credits beyond the intermediate level, to include Spanish 38.210★, 38.211★ and two literature credits at the 300 level.

Minimum Requirements for Pass and Honours Students

The Department requires Pass and Honours students to have a minimum of C- in each required literature course at the 300 or 400 level or an average of C overall in these courses.

Honours Programs

Honours in Spanish

General regulations concerning Honours programs are to be found on pp. 59-64. The Honours program in Spanish is designed to give the student a thorough knowledge of Hispanic language and literature. Lectures and seminars cover the origins and evolution of the language, the principal periods of Spanish and Spanish American literature, and include some study of allied literatures with a view to further work at the graduate level. The program consists of eight credits beyond the intermediate level to include Spanish 38.210★, 38.211★, three literature credits at the 300 level and at least two literature credits at the 400 level. For an explanation of Honours standing see pp. 59-64.

Combined Honours in Spanish and French

This program is recommended especially for students wishing to enter a Faculty of Education in one of the Ontario universities after completion of the B.A. with a view to becoming a language teacher in a secondary school. Six credits beyond the intermediate level are required in each language. Required courses in Spanish are 38.210★, 38.211★, two literature credits at the 300 level and at least one literature credit at the 400 level.

Other Combined Honours Programs

Students interested in pursuing an Honours program in which Spanish is combined with another discipline are invited to discuss the matter with the Supervisor of Honours in the Department of Spanish. The minimum requirements are six credits beyond the intermediate level in Spanish, to include Spanish 38.210★, 38.211★, two literature credits at the 300 level and at least one literature credit at the 400 level.

Graduate Courses

Students in Fourth-year Honours may take a maximum of two credits at the 500 level with special permission of the Graduate Studies Committee of the Department of Spanish. These courses are listed separately in the Graduate Studies and Research Calendar.

Prerequisites

All students wishing to enrol in a course for which they do not have the prerequisite must obtain the permission of the Department.

Courses Offered

Note:

Students who have already taken any of the following full-credit courses (no longer offered) may not enrol for additional credit in either of the corresponding half-credit courses introduced in 1980-81: Spanish 38.210 (38.210★, 38.211★), 38.320 (38.320★, 38.321★), 38.330 (38.330★, 38.331★), 38.350 (38.350★, 38.351★), 38.415 (38.415★, 38.416★), 38.420 (38.420★), 38.430 (38.430★, 38.431★), 38.435 (38.435★, 38.436★), 38.440 (38.440★, 38.441★), 38.460 (38.460★, 38.461★), 38.470 (38.470★, 38.471★).

Spanish 38.115

Introductory Spanish

A course for those with no knowledge of Spanish, designed to give the student the fundamentals of spoken and written Spanish, through oral practice, reading and laboratory work.

Day and Evening divisions: Lectures and laboratory four hours a week.

Also offered in Intensive Spanish Program (Fall term).

Spanish 38.120 (two credits)

Intensive Introductory Spanish

A course designed for students with little or no knowledge of Spanish. Using an intensive audiolingual approach to Spanish, students can attain in one year the level of proficiency and fluency normally gained in Spanish 38.115 and 38.150. Students not making satisfactory progress will be transferred to the regular introductory course (Spanish 38.115).

Prerequisite: Permission of the Department.

Day division: Lectures and laboratory six hours a week.

Spanish 38.150

Intermediate Spanish

A course for those with at least one year of Spanish. Grammar review, extensive reading, guided composition, laboratory work.

Prerequisite: Spanish 38.115 or equivalent.

Day and Evening divisions: Lectures and laboratory four hours a week.

Also offered in Intensive Spanish Program (Fall term).

Spanish 38.151

Intensive Intermediate Spanish

A course for potential Majors and for those with Grade 13 Spanish or equivalent. Review of grammar and some advanced syntax; extensive reading, discussion and composition. Laboratory work.

Prerequisites: Spanish 38.115 or equivalent, and permission of the Department. With special permission of the Department, students enrolled in this course may take Spanish 38.201★ simultaneously.

Not offered 1990-91.

Spanish 38.201★

Spanish Conversation

Conversation and discussion of current problems, supplemented by occasional written work.

Prerequisite: Spanish 38.150 or 38.151 or 38.120 or permission of the Department.

Day and Evening divisions, Fall term: Three hours a week. Also offered in Intensive Spanish Program (Fall term).

Spanish 38.202★

Spanish Composition

A course designed to consolidate the linguistic knowledge attained in Spanish 38.150 and to inculcate the elements

of a good Spanish style.

Prerequisite: Spanish 38.150 or 38.151 or 38.120 or permission of the Department.

Day and Evening divisions, Winter term: Three hours a week.

Also offered in Winter Program Abroad (Winter term).

Spanish 38.210★

Spanish Civilization

The cultural heritage of Spain in its social and geographical contexts.

Prerequisite: Spanish 38.150 or 38.151 or 38.120 or permission of the Department.

Day division, Fall term: Three hours a week.

Also offered in Winter Program Abroad (Winter term).

J. Jurado

Spanish 38.211★

Spanish-American Civilization

The cultural heritage of Spanish America in its social and geographical contexts.

Prerequisite: Spanish 38.150 or 38.151 or 38.120 or permission of the Department.

Day division, Winter term: Three hours a week.

Also offered in Winter Program Abroad (Winter term).

M.A. Giella

Spanish 38.235

An Introduction to Hispanic Theatre

A study of the theory and practice of dramatic production in Spain and Spanish America together with detailed analysis and interpretative reading of representative plays. Students in the course are required to participate in the staging of a play.

Prerequisite: Spanish 38.150 or 38.151 or 38.120 or permission of the Department.

Not offered 1990-91.

Spanish 38.301★

Advanced Oral Spanish

An advanced sequel to Spanish 38.201★.

Prerequisite: Spanish 38.201★ or permission of the Department.

Evening division, Fall term: Three hours a week.

Also offered in Winter Program Abroad (Winter term).

Spanish 38.302★

Advanced Spanish Composition

An advanced sequel to Spanish 38.202★.

Prerequisite: Spanish 38.202★ or permission of the Department.

Evening division, Winter term: Three hours a week.

Also offered in Winter Program Abroad (Winter term).

Spanish 38.303★

Spanish Phonetics and Phonology

A descriptive study of the sounds and sound patterns of Spanish. Practical exercises, written and oral.

Recommended for teachers.

Prerequisite: Spanish 38.201★ and 38.202★ or permission of the Department.

Not offered 1990-91.

Spanish 38.305

Intensive Oral Spanish

An intensive course in Spanish conversation which, being offered only in a Spanish-speaking country, also provides an introduction to Hispanic culture. Students who satisfactorily complete this course are ineligible to enrol subsequently in Spanish 38.201★ or 38.301★.

Offered only in the Summer session. Compulsory atten-

dance at all classes and participation in all activities.

Prerequisite: Spanish 38.150 or 38.151 or 38.120 or permission of the Department.

Not offered 1990-91.

Spanish 38.320★

The Golden Age I

A study of representative works of Spanish literature of the Renaissance and Early Baroque periods.

Prerequisite: Spanish 38.210★ or 38.235 or permission of the Department.

Day division, Fall term: Three hours a week.

C.A. Mardsen

Spanish 38.321★

The Golden Age II

A study of representative works of Spanish literature of the Baroque period.

Prerequisite: Spanish 38.210★ or 38.235 or permission of the Department.

Day division, Winter term: Three hours a week.

J.M. López-Saiz

Spanish 38.330★

Nineteenth-Century Spanish Literature

A study of representative works of the major movements (Romanticism, *costumbrismo*, Realism and Naturalism) and authors of Spanish literature of the nineteenth century.

Prerequisite: Spanish 38.210★ or 38.235 or permission of the Department.

Day division, Fall term: Three hours a week.

F. Atienza

Spanish 38.331★

Twentieth-Century Spanish Literature

A study of representative works of Spanish literature from the Generation of 1898 on.

Prerequisite: Spanish 38.210★ or 38.235 or permission of the Department.

Day division, Winter term: Three hours a week.

J.M. López-Saiz

Spanish 38.350★

Spanish-American Literature, 1500-1888

A study of representative works of Spanish-American literature of the Colonial Period and the nineteenth century prior to Modernism.

Prerequisite: Spanish 38.211★ or 38.235 or permission of the Department.

Evening division, Fall term: Three hours a week.

M.A. Giella

Spanish 38.351★

Spanish-American Literature from Modernism to the Present

A study of representative works of Spanish-American literature since 1888.

Prerequisite: Spanish 38.211★ or 38.235 or permission of the Department.

Evening division, Winter term: Three hours a week.

P.J. Roster

Spanish 38.402★

Theories of Literature

This course focuses on the theoretical discussion of literature from about 1920 to the present. Included in the study are Russian Formalism, American New Criticism and such other approaches as the structuralist, semiotic, socio-cultural and hermeneutic. Offered by the Comparative Literature Committee as Theories of Literature 17.402★. Spanish

students will register in Spanish 38.402★, and will use Hispanic texts for exercises of practical application.

Prerequisite: Permission of the Comparative Literature Committee.

Fall term: Three hours a week.

Spanish 38.415★

Medieval Spanish Literature from the Origins through 1300

A study of major works of Spanish literature from the earliest times through the thirteenth century.

Prerequisite: Spanish 38.210★ or 38.235 or permission of the Department. Students will normally have taken a literature course at the 300 level before enrolling in this course.

Not offered 1990-91.

Spanish 38.416★

Medieval Spanish Literature, 1300-1500

A study of major works of Spanish literature of the fourteenth and fifteenth centuries.

Prerequisite: Spanish 38.210★ or 38.235 or permission of the Department. Students will normally have taken a literature course at the 300 level before enrolling in this course.

Not offered 1990-91.

Spanish 38.420★

Cervantes

A study of Cervantes and his age, with particular reference to *Don Quijote*.

Prerequisites: Spanish 38.320★ and 38.321★ or permission of the Department.

Not offered 1990-91.

Spanish 38.430★

Modern Spanish Novel

Analysis and interpretation of works by major Spanish novelists from the beginnings of Realism in the nineteenth century up to the Civil War in 1936.

Prerequisites: Spanish 38.330★ and 38.331★, or permission of the Department.

Not offered 1990-91.

Spanish 38.431★

Contemporary Spanish Novel

Analysis and interpretation of works by major Spanish novelists from the Civil War to the present.

Prerequisites: Spanish 38.330★ and 38.331★ or permission of the Department.

Not offered 1990-91.

Spanish 38.435★

Modern Spanish Drama

Analysis and interpretation of works by major Spanish playwrights of the nineteenth and early twentieth centuries, together with study of related dramatic theory.

Prerequisites: Spanish 38.330★ and 38.331★ or permission of the Department.

Not offered 1990-91.

Spanish 38.436★

Contemporary Spanish Drama

Analysis and interpretation of works by major Spanish playwrights from the Civil War to the present, together with study of related dramatic theory.

Prerequisites: Spanish 38.330★ and 38.331★ or permission of the Department.

Not offered 1990-91.

Spanish 38.440★

Modern Spanish Poetry

A study of Spanish poetry and poetics of the nineteenth and early twentieth centuries.

Prerequisites: Spanish 38.330★ and 38.331★ or permission of the Department.

Not offered 1990-91.

Spanish 38.441★

Contemporary Spanish Poetry

A study of Spanish poetry and poetics from the Generation of 1927 to the present.

Prerequisites: Spanish 38.330★ and 38.331★ or permission of the Department.

Not offered 1990-91.

Spanish 38.460★

Twentieth-Century Spanish-American Novel I

Analysis and interpretation of works by major Spanish-American novelists of the first half of the twentieth century. The regionalistic novel of social realism, including novels of the Mexican Revolution, the pampa, the jungle and the Andes.

Prerequisites: Spanish 38.350★ and 38.351★ or permission of the Department.

Not offered 1990-91.

Spanish 38.461★

Twentieth-Century Spanish-American Novel II

Analysis and interpretation of works by major Spanish-American novelists of the first half of the twentieth century. Novels of universal theme, especially reflecting artistic, philosophical and psychological concerns.

Prerequisites: Spanish 38.350★ and 38.351★ or permission of the Department.

Day division, Winter term: Three hours a week.

R. Larson

Spanish 38.470★

Twentieth-Century Spanish-American Poetry I

A study of the principal tendencies in twentieth-century Spanish-American poetry with special emphasis on the modernist poets, the post-modernist *poetisas* and the creationism of Huidobro.

Prerequisites: Spanish 38.350★ and 38.351★ or permission of the Department.

Day division, Fall term: Three hours a week.

R.L. Jackson

Spanish 38.471★

Twentieth-Century Spanish-American Poetry II

A study of the principal tendencies in twentieth-century Spanish-American poetry, with special emphasis on the social poetry of César Vallejo, Nicolás Guillén and Pablo Neruda.

Prerequisites: Spanish 38.350★ and 38.351★ or permission of the Department.

Not offered 1990-91.

Spanish 38.490

Seminar on a Special Topic

Designed for Honours students normally in their final year, or for Graduate students.

Not offered 1990-91.

Spanish 38.491★

Seminar on a Special Topic

Designed for Honours students normally in their final year, or for Graduate students. Topic for 1990-91: *The Literature of the Medieval Kingdom of Castile: A study of the principal tendencies in Castilian literature with special emphasis on*

the *Poema de Mio Cid*, Berceo, Alfonso X, Juan Ruiz and other authors.

Day division, Winter term: Three hours a week.

J. Jurado

Spanish 38.492★

Special Studies

From time to time members of the Department form small groups to study certain problems or aspects of Spanish literature in greater depth than is possible in other courses. It is expected that under the terms of the Madrid-Carleton Agreement, a Visiting Professor from Madrid will be teaching Contemporary Spanish Literature in 1990-91. Interested students should consult the Department.

Evening division, Fall term: Three hours a week.

• **Portuguese Course**

Portuguese 38.116

Introductory Portuguese

A course designed to provide the student with the fundamentals of Portuguese grammar, a basic vocabulary and speaking knowledge of Portuguese. Students who have taken courses in other Romance languages should make considerable progress.

Not offered 1990-91.

Secretariat: Paterson Hall, Room 330
Telephone: 788-6645

Members of the Institute

Director

Frances Cherry

Joint Chair in Women's Studies (Carleton University and University of Ottawa)

Monique Bégin

Heather Jon Maroney (*Women's Studies/Sociology/Anthropology*)

Committee of Management

Flo Andrews (*Sociology-Anthropology*)

Valda Blundell (*Sociology-Anthropology*)

Elinor Burwell (*Psychology*)

David Coll (*Faculty of Engineering*)

Brettel Dawson (*Law*)

Linda Duxbury (*Business*)

Barbara Freeman (*Journalism*)

Barbara Gabriel (*English*)

Marvin Glass (*Philosophy*)

Deborah Gorham (*History*)

Pat Kalyniak (*Physics*)

Natalie Luckyj (*Art History*)

Colleen Lundy (*Social Work*)

Suzanne Mackenzie (*Geography*)

Rianne Mahon (*Public Administration*)

Zuzana Pick (*Film Studies*)

Joe Ramisch (*Religion*)

Eileen Saunders (*Mass Communication/Journalism*)

Pat Smart (*French*)

Jill Vickers (*Canadian Studies*)

Gurlie Woods (*Comparative Literature*)

Susan Boyd (*Law*)

Carole Dence (*Registrar, Arts and Social Sciences*)

Mike Fox (*Co-ordinator, Directed Interdisciplinary Studies*)

Fran Klodawsky (*Co-ordinator, Status of Women*)

Tom Wilkinson (*Director, School of Continuing Education*)

Graduate Student Members

Beverly Boutilier

Sue Sorrell

Danette Steele

Undergraduate Student members

Julie Beck

Anne Boys

Sandra Brown

Carole Hubbard

Jane LeFeuvre

Lynn MacDonald

Karen Miller

Annette Patel

General Information

In September, 1987, Carleton established the Institute of Women's Studies. The Institute continues and expands on the work of its predecessor, the Interfaculty Committee on

Women's Studies, which began its operation in the early 1970s.

The Institute of Women's Studies is intended to foster research, studies and communication among colleagues in this area. Joining in this venture is the Hon. Monique Bégin, the first incumbent of the Chair in Women's Studies, held jointly at Carleton and the University of Ottawa. Over the years, the Institute will continue to promote an awareness on the part of all disciplines to include a fuller treatment of women's experience.

Women's Studies courses have been offered at Carleton since 1971-72 by several departments. Beginning in the academic year 1989-90, Combined Pass and Combined Honours programs in Women's Studies and a second Arts or Social Sciences discipline are offered. The Combined Pass and Combined Honours programs are intended for those students wanting a focussed approach to Women's Studies in combination with a second Arts or Social Sciences discipline. The Combined Pass program is intended to give students a general overview of the field of Women's Studies. The Combined Honours program requires a deeper study of the methodological and theoretical implications of Women's Studies. Both programs offer interdisciplinary perspectives while also requiring students to develop a disciplinary base for their studies.

Graduation Requirements

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 66-67), in addition to all Institute regulations and requirements as set out below.

Combined Pass Program

Students planning a Combined Pass program are advised to consult with the Director of the Institute of Women's Studies.

The requirements for a Combined Pass program in Women's Studies and another discipline are at least five credits as follows:

1. Women's Studies introduction: 09.188 Introduction to Women's Studies

2. Social Science electives: Two credits from: Sociology 53.247, Anthropology 54.248★, 54.249★, Political Science 47.313★, 47.318★, Psychology 49.363★, Law 51.301★.

3. Arts electives: Two credits from: English 18.292, Religion 34.203★, Philosophy 32.236★, History 24.254, 24.354, Mass Communication 27.355★.

Other courses may be substituted for the credits specified above in items 2 and 3 (e.g. French 20.381★) when material on gender and/or women's experience is central to the course. Such substitutions must be individually approved by the Institute of Women's Studies.

Combined Honours Program

Students planning a Combined Honours Program are advised to consult with the Director of the Institute of Women's Studies or a designated member of the Institute.

The requirements for a Combined Honours in Women's Studies are at least *seven* credits as follows:

1. Women's Studies introduction: 09.188 Introduction to Women's Studies
2. Women's Studies theory or methodology: 09.388 Theory and Methods from a Feminist Perspective
3. Social Science electives: Two credits from: Sociology 53.247, Anthropology 54.248★, 54.249★, Political Science 47.313★, 47.318★, Psychology 49.363★, Law 51.301★.
4. Arts electives: Two credits from: English 18.292, Religion 34.203★, Philosophy 32.236★, History 24.254, 24.354, Mass Communication 27.355★.

5. 400-level elective.

One additional credit from: Women's Studies 09.490★, 09.491★, 09.492★, 09.498, History 24.459, Law 51.401★, 51.402★. Students who choose Women's Studies 09.498 are required to present a minimum grade of *B-*.

Other courses may be substituted for the credits specified above in items 3, 4, and 5 (e.g. French 20.381★, Art History 11.400★) when material on gender and/or women's experience is central to the course. Such substitutions must be individually approved by the Institute of Women's Studies.

Courses Offered

Women's Studies 09.188

Introduction to Women's Studies

A survey course, designed to increase the student's understanding of the position of women in contemporary society. The course offers an introduction to such issues as biological and cultural sex differentiation, women and literature, women and religious institutions, women and politics, women and social and health services and women and the law. A brief introduction to the intellectual and social origins of feminism and a survey of women's place in Western European history provides a context for examining women's position in contemporary society. Precludes additional credit for Women's Studies 09.288, no longer offered.

Lectures and discussion three times a week.

Also offered on ITV as 09.188V.

Women's Studies 09.388

Theory and Methods From a Feminist Perspective

This course draws on the emerging feminist literature in the humanities and in the social, natural, and applied sciences. Feminist critiques of prevailing approaches to knowledge are considered as well as feminist contributions to the development of theory and method. Emphasis on particular areas may vary from year to year.

Prerequisites: Third-year standing and Women's Studies 09.188 or 09.288.

Lectures and discussion three hours a week.

Women's Studies 09.490★ A and B Sections

Independent Study

A reading or research course for selected students who wish to investigate a particular topic of interest under the supervision of an individual faculty member. Available to Third and Fourth-year students. A written outline of the course approved by the supervisor must be submitted to the Institute of Women's Studies one week before the last day for course changes. Normally, students may not offer more than one-half credit of independent study in their total Women's Studies program.

Prerequisites: Third or fourth-year standing and permission of the Institute of Women's Studies.

Women's Studies 09.491★

Selected Topics in Women's Studies I

Topic for Fall term 1990-91: To be announced.

Women's Studies 09.492★

Selected Topics in Women's Studies II

Topic for Winter term 1990-91: To be announced

Prerequisite: Permission of the Institute of Women's Studies.

Seminar three hours a week.

M. Bégin

Women's Studies 09.498

Honours Research Essay

Students in the Combined Honours Program in Women's Studies and another discipline may write an Honours research essay in Women's Studies in their Fourth year only where they present a *B+* average over all courses in Women's Studies and where the second Honours discipline does not offer an honours essay or thesis. The subject for research is settled in conjunction with the Institute and an appropriate supervisor.

Prerequisites: Fourth-year standing in Women's Studies and Women's Studies 09.388.

Courses with Substantial Material on Gender or Women's Experience Offered Within the Arts and Social Science Faculties

The following course offerings are listed here for the convenience of students. Detailed course descriptions are given under the appropriate faculty, or interdisciplinary listing. Please note that some of the courses listed below may not be offered in 1990-91. Students should consult the timetable, published in early June, for the list of courses offered in 1990-91.

Faculty of Arts

Art History

11.400★ Topics in Canadian Art: Canadian Women Artists in the Twentieth Century (not offered 1990-91)

Comparative Literature

17.506T2 Styles and Periods: Women Writers Around World War I

English

18.292 Women and Literature

French

20.381 L'écriture et la différence sexuelle dans des textes littéraires Québécois

History

24.254 Introduction to the History of Women
24.354 Women and North American Society (not offered 1990-91)

24.459 Selected problems in the History of Women and the Family: from the Industrial Revolution

24.559 Women in Nineteenth- and Twentieth-Century North America and Britain (not offered 1990-91)

Mass Communication

27.355★ Media and Gender

Philosophy

32.236★ Philosophy and Feminism

Religion

- 34.203★ Women in the Christian Tradition

Faculty of Graduate Studies and Research

School of Social Work

- 52.506★ Women and Welfare
52.528★ Feminist Counselling
52.542★ Women and Social Policy

Institute of Canadian Studies

- 12.402 Technology and the Canadian Mind
12.520 Women's Studies

Faculty of Social Sciences

Anthropology

- 54.248★ The Anthropology of Women
54.249★ Development, Dependency and Gender
54.475★ Contemporary problems in Anthropology. Topic for 1990-91: Gender, Ethnicity and Race (Ascriptive Bases of Inequality)
54.519★ Development, Dependency and Gender
54.538★ Feminist Analyses

Geography

- 45.544 Gender and Environments
45.542 Selected Concepts in Social Geography
45.543 Selected Concepts in Cultural Geography

Law

- 51.301★ Women and the Legal Process
51.384 Law of the Family
51.401★ Law, Family and Gender
51.402★ Feminist Theories of Law

Political Science

- 47.313★ Women in Politics: A Comparative Perspective
47.318★ Women in Developing Politics: A Comparative Assessment

Psychology

- 49.363★ Psychology of Women
49.580★ Psychology of Women

Sociology-Anthropology

- 56.241 Kinship, Marriage and the Family
53.247 Women in Society
53.485★ Contemporary Problems in Sociology. Topic for 1990-91: *Sexuality and Reproduction in Feminist Theory*
53.537★ Psychoanalysis and Cultural Studies
53.538★ Feminist Analyses
53.566★ Selected Topics in Sociology. Topic for 1990-91: *Women and International Migration*
53.568★ Women and Work

Courses Planned for Summer School

Offered in the Spring session 1990 will be History 24.459
Selected problems in the History of Women and the Family:
from the Industrial Revolution.

School of Computer Science

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Herzberg Building, Room 538
Telephone: 788-4333

Officers of the School

Director
J.R. Pugh

Professors
M. Atkinson
F. Fiala
W.R. Lalonde
J.E. Neilson
N. Santoro

Associate Professors
B.J. Oommen
F. Oppacher
E.J. Otoo
J.R. Pugh
J.-R. Sack
D.A. Thomas

Assistant Professors
S.P. Dandamudi
F. Dehne
L. Nel
I. Reichstein

Instructor
P. White

Registrar
B.R. Lifeso (*Joint appointment, Faculty of Science*)

Research Associate
J.J. des Rivières

*Supervisor of Graduate Studies, Director, Ottawa-Carleton
Institute for Computer Science*
J.-R. Sack

Sessional Lecturer
S. Jansen

Administrator, Co-operative Program
I. Reichstein

General Information

The School of Computer Science offers a variety of programs and courses which together provide a wide spectrum of educational opportunities for students wishing to specialize in Computer Science. The Honours Bachelor of Computer Science (B.C.S.) program is professionally recognized and accredited by CIPS, the Canadian Information Processing Society. A co-operative education stream is also available within this program allowing students to complement their academic studies with practical experience in the work-place. In addition, the School offers combined Bachelor of Science (B.Sc.) Honours programs with the Department of Mathematics and Statistics and the Department of Physics. The School offers a number of introductory courses that may stand alone in a program of another field of study or be augmented by a selection of

other Computer Science courses to form an area of specialization.

Programs offered at the Graduate level include the Master of Computer Science (M.C.S.) program offered in conjunction with the Ottawa-Carleton Institute for Computer Science, and the more interdisciplinary Master of Information System Science (M.Sc.) program. For details of these programs please refer to the Calendar of Graduate Studies and Research.

Students in the School of Computer Science have access to an extensive range of computing resources. The undergraduate laboratories of the School contain more than 150 16-bit personal computer workstations, more than 40 32-bit workstations, and a variety of special purpose machines and facilities. Additionally, the research laboratories of the School house state-of-the-art facilities for use by graduate students. Finally, all students have access to the campus-wide computing facilities, which include Honeywell mainframe computers.

Bachelor of Computer Science (Honours), B.C.S. (Hons.) Program

The B.C.S. program is an Honours degree program in which candidates are required to complete 20 credits or equivalent after admission to First year. Students in the co-operative education stream are minimally required to complete an additional four work-term half course credits.

In order to provide the student with a choice of specialization, the program is designed around a core curriculum combined with a choice of five program options. These options are designed to prepare graduates for professional careers in computer-related occupations or for advanced study at the graduate level.

The program is offered mainly in the Day division. Part-time students will find, however, that some of the courses are also available in the Evening division.

Admission Requirements

First Year

1. Completion of Qualifying University year in Arts, Engineering or Science, with a grade-point average of 4.0 or better, and including Mathematics 69.006★ and 69.007★; or
2. The Ontario Secondary School Diploma or equivalent, including six Ontario Academic Courses (OACs) with a minimum average of 65 percent, including one OAC in Calculus and one OAC in Algebra and Geometry. For the Hardware and Scientific Applications options, an OAC in Physics must also be included among the six OACs necessary for admission and would be advantageous for the Software and Theory of Computing options; or
3. The Ontario Secondary School Honour Graduation Diploma with a minimum 65 percent average and including Functions and Calculus. Physics is required for the Hardware and Scientific Applications options and would also be advantageous for students electing the other options.

Advanced Standing

Applications for admission beyond First year will be assessed on their individual merits. Advanced standing will

be granted only for those subjects assessed as being appropriate for the program and for the option elected.

Mature Applicants

Persons who lack the normal entrance requirements as published in this Calendar may receive consideration for admission under the mature applicant policy. Applicants will normally have been away from full-time studies for a minimum of two years and must be 21 years of age, or over, by December 31 of the year in which they wish to enrol. For full details see p. 28.

Enrolment Limitation

Applicants should note that meeting the admission requirements can only establish eligibility for selection to the School of Computer Science.

Course Requirements

The program for the degree of Bachelor of Computer Science (Honours) consists of a total of 20 credits, normally five taken each year, including at least seven and one half Computer Science credits, three and one half from Mathematics and Statistics, two from the Faculties of Arts and Social Sciences, and to include at least two credits chosen from 400-level courses.

Because the study of computer science is necessarily structured, students are required to select a course of study from one of five options in addition to those courses of the core program. The options are:

1. Software
2. Hardware
3. Theory of Computing
4. Scientific Applications
5. Management and Business Systems

Relevant Courses

All courses bearing a 95 prefix carry the designation Computer Science. In addition, the following courses offered by the School of Business and the Faculty of Engineering are relevant to the B.C.S. program, are counted as Computer Science credits and are treated as Computer Science courses in the calculation of grade-point averages. (See also p. 278.)

Business 42.230★, 42.240★, 42.342★, 42.348★, 42.440★, 42.442★, 42.446★.

Engineering 94.333★, 94.405★, 94.457★.

Core Courses

All students enrolled in the Computer Science degree program are required to complete the following core courses:

First Year

Mathematics 69.104★ and 69.114★;
Computer Science 95.105★, 95.185★, 95.106★ and 95.102★.

Second Year

Mathematics 69.207★ and 69.217★;
Computer Science 95.202★, 95.203★ and 95.204★.

Third Year

Mathematics 69.311★;
Computer Science 95.300★, 95.304★, 95.305★, 95.384★ and 95.385★.

Note: Students in the Management and Business Systems Option who wish to take Business 42.442★, Business Systems II, in Fourth year, should replace Computer Science 95.304★ with Business 42.342★.

Fourth Year

Computer Science 95.495★.

Program Options

Software Option

This option is intended for students whose interests include the design and implementation of large-scale software systems. Examples of such systems are language processors, operating systems and data management systems. Program requirements for the Software option are:

First Year

One credit in an experimental science.

Second Year

Mathematics 69.265★;
Computer Science 95.207★.

Third and Fourth Years

Mathematics 69.208★ or one half credit in Mathematics at the 300 level or above;
Computer Science 95.302★, 95.401★, 95.484★;
Two additional Computer Science half credits at the 300 level or above; and
Two additional Computer Science half credits at the 400 level.

Hardware Option

This option is intended for students seeking to combine an interest in computing with an interest in electronics. It prepares students for careers in the design and construction of both large- and small-scale computer systems. Program requirements for the Hardware option are:

First Year

Physics 75.100.

Second Year

Mathematics 69.208★, 69.265★;
Computer Science 95.206★;
Engineering 91.251★.

Third Year

One half credit in Mathematics at the 300 level or above;
Computer Science 95.306★;
Engineering 97.257★.

Fourth Year

One Engineering or Computer Science half credit at the 300 level or above.
Three Engineering or Computer Science half credits at the 400 level or above.

Theory of Computing Option

This option is intended for students with an interest in the

theoretical aspects of computer science. While retaining a good number of practical courses, the option emphasizes the theoretical aspects, thus providing the student with a sound foundation for graduate studies. Program requirements for the Theory of Computing option are:

First Year

One credit in an experimental science.

Second Year

Mathematics 69.265★;

One of Computer Science 95.206★ or 95.207★.

Third and Fourth Years

Mathematics 69.208★ or one half credit in Mathematics at the 300 level or above;

One of Mathematics 70.482★, Computer Science 95.483★, or 95.486★;

Two of Computer Science 95.302★, 95.386★, or 95.401★.

Computer Science 95.484★ and 95.485★;

One Computer Science half credit at the 200 level or above.

Two Computer Science half credits at the 300 level or above.

Scientific Applications Option

This option is intended for students whose interest in computers centres around the applications of computers to science. It provides a strong framework of Computer Science courses to which additional Science courses may be added. Program requirements for the Scientific Applications option are:

First Year

Physics 75.100.

Second Year

Mathematics 69.208★;

Computer Science 95.206★.

One experimental Science credit.

Third Year

Mathematics 69.265★;

Computer Science 95.386★;

One experimental Science credit at the 200 level or above.

Fourth Year

Computer Science 95.306★;

Two of Engineering 94.405★, Computer Science 95.484★, or 95.486★;

One Computer Science half credit at the 400 level or above.

Management and Business Systems Option

This option is intended for students whose interests include the application of computers to business. It is designed to prepare students for the careers in this field, with a combination of Computer Science courses and a strong component of courses selected from those offered by the School of Business. Program requirements for the Management and Business Systems option are:

First Year

Business 42.101★ and 42.102★;

Economics 43.100.

Second Year

Business 42.230★, 42.240★, 42.250★;

Mathematics 69.257★.

Third Year

Business 42.210★;

One of Business 42.348★ or Computer Science 95.207★.

Fourth Year

Two half credits in Business at the 300 level or above;

One half credit in Business at the 400 level;

One of Mathematics 69.259★ or Computer Science 95.386★;

Computer Science 95.403★;

One Computer Science half credit at the 400 level.

Counselling and Program Approval

Every student in the Bachelor of Computer Science degree program will be assigned a full-time faculty member who will act as a program adviser. Students are expected to seek counsel from their assigned advisers in such matters as selecting options and choosing elective courses. The advisers are responsible for approving both programs and course changes.

The Co-operative Education Stream

Students in the Bachelor of Computer Science program have the opportunity to enrol in a co-operative education stream. Students admitted to this stream must satisfy the normal requirements for graduation from the B.C.S. program and, in addition, the graduation requirements specific to the co-operative stream.

Co-operative education is based on the principle that during the undergraduate years an academic program combined with integrated work experience in alternating terms, is relevant to, and desirable for, effective professional preparation. The work terms allow the student to acquire experience in the area of career interest, while the academic terms can more properly be devoted to fundamental and theoretical studies. The practical experience is in no sense a substitute for, but is rather a complement to, the academic studies.












The motivation, responsibility and opportunity for insight gained through co-operative education can be of significant value to the student's future. The co-operative concept enables those with a career orientation to become full-time students of their subject, both during the academic terms and during the related work terms, within a structure of organized purpose and serious study.

Operation of the Co-operative Stream

Necessary arrangements for integrating work terms, securing potential employers, arranging interviews, and generally managing the employment process are the responsibilities of the Co-operative Program Administrator. With the assistance of faculty, the Co-operative Program Administrator counsels students, visits them on the job, assists them to adjust to work situations, and encourages their professional development.

The Work/Study Sequence

Students admitted to the Co-operative stream normally enter the work-place for their first work term on completion of year two in the B.C.S. program. The normal mode of operation requires two eight-month (or double) work terms and one four-month (or single) work term as shown on p. 269.

	Term		
	Summer	Fall	Winter
Year 3			
Year 4			
Year 5			
	 Academic Terms  Work Terms		

Students in the Co-operative stream will require 56 months to complete their program as opposed to 44 months in the regular Honours program. Variations in the work study sequence may be requested due to academic or work situations in upper years. Precise start and finish dates for work terms are established in consultation with Co-operative employers.

Co-operative Stream Admission Requirements and Registration Information

To be eligible for admission to the Co-operative stream within the B.C.S. program, a student must:

- have a cumulative grade-point average of 8.0 or better in Computer Science and 6.5 or better overall;
- have successfully completed 3.0 credits in Computer Science;
- be eligible to work in Canada.

Note that meeting the above requirements only establishes eligibility for admission to the program. Enrolment in the Co-operative stream is limited; the number of students admitted will generally be dependent on the prevailing job market.

Application forms are available from the School of Computer Science Office. Completed forms should be returned to the same office. Most students will normally apply in November of the Fall term of Second year. Admission decisions are based on grade-point averages as of the following January. Normally admission decisions will be made by January 31.

Employment

Although every effort is made to find a sufficient number of work-term positions for all students enrolled in the Co-operative stream, no guarantee of employment can be made. The employment process is competitive, and academic performance, skills, motivation, maturity, attitude and potential, will determine whether a student is offered a job.

Registration Through Final Term

All work terms must be completed before the final academic term and the last work report must be submitted no later than the beginning of the final academic term. Co-operative students must be registered as full-time students in the Bachelor of Computer Science program in all academic terms of the Co-operative program from point of entry through to the final academic term. The only exception occurs when a student may have sufficient credits to be able to register as a part-time student in the final term.

During a work term, co-operative students will register in one of five co-operative work term report courses; Computer Science 95.320★, 95.321★, 95.322★, 95.420★, or 95.421★. While on a work term, students are limited to one half-credit course, unless they have written support from their employer to take two half-credit courses.

Seeking Employment and Employer Interviews

Seeking Employment

Students are expected to seek employment through the interview process arranged by the Co-operative Program Administrator. Students may not seek employment directly with a Co-operative employer unless specific arrangements are made with the School. Students who wish to arrange their own work term assignment must have the position evaluated by the School before it may be considered for credit. Students intending to find their own jobs may not take part in the normal application and interview process arranged by the School.

Initial Job Application

The maximum number of initial job applications allowed may vary from time to time, depending on the number of job opportunities and the number of students seeking employment. The maximum number will be conveyed to students in the Co-operative stream by the Co-operative Program Administrator.

Re-posting and Late Posting

Students may apply for a specified maximum number of additional interviews with employers who submit their job description late, as well as with employers who receive limited response to their initial advertisement.

Release of Information

A Co-operative Student Record is maintained for each student in the co-operative stream. This record contains information relating to the completion of work terms, assessment of work term reports, Employer Evaluation of Co-operative Student forms, records of Co-ordinator interviews, etc. This confidential file is available for examination upon the student's proof of identification. No information may be removed from the file. By registering in the Co-operative education stream, students agree that academic transcripts and pertinent information from a student's co-operative student record form part of the application package and may be made available to potential employers. Copies of Employers Evaluation of Co-operative Student forms will be released only upon written authorization from the employer, as this form is considered to be an extension of the employer's file.

Missing Interviews

Students are expected to attend all individual interviews granted to them. Students who anticipate missing an interview for just cause should inform the School immediately so that other arrangements can be made.

Ranking Employers

Students are required to rank all employers by whom they are interviewed. Ranking an employer indicates an agreement to work with that employer if placed there through the placement program. Refusal to accept the job will normally result in a work term failure being recorded on the Co-operative Student Record.

Deleting Job Choices

The deletion of a job choice will be considered when the student consults with the Co-operative Program Administrator.

Acceptance of Employment

When students are placed, they are notified to sign an Acceptance of Employment form, signifying their knowledge of having made a work-term commitment with an employer. Each student is expected to write a letter of acceptance to the employer following notification of placement.

Inability to Find Suitable Employment

In the case that a student is unable to obtain suitable employment through the normal placement process or has been given permission to seek his/her own job but fails to do so, the student is expected to register as a full-time student in the Bachelor of Computer Science program. The only exception to this rule occurs in the Summer term.

Failure to Report to Employer

Failure to report to an employer without prior approval from the Co-operative Program Administrator will normally result in a work term failure being recorded on the Co-operative Student Record.

Leaving Employer Without Prior Approval

Terminating employment without prior approval from the Co-operative Program Administrator will normally result in a work term failure being recorded on the Co-operative Student Record.

Strikes

It is each individual student's responsibility to decide whether or not to cross a picket line in the case of a strike. The role of the Co-operative Program Administrator in this situation is to inform the student of the potential results of either decision.

Dismissal With Cause

Dismissal of a student by an employer will be investigated by the Co-operative Program Administrator and will normally result in a work term failure being recorded on the Co-operative Student Record.

Commitment

A minimum of two consecutive work terms with an employer is expected. Provision is, however, allowed for such situations as one-term jobs and economic uncertainty.

Change of Work Term — Academic Term Sequence

Upon entry to the Co-operative program, a student is expected to follow the prescribed work term/academic term sequence. However, applications to change the sequence will be considered by the School. Application, in the form of a letter from the student, must be made to the School of Computer Science. Normally the request should be made within the first two weeks of the term preceding the switch point. In addition, the student's academic performance must be "in good standing".

Communication with the School

Each student is expected to maintain communication with the School on all matters pertaining to participation in the Co-operative program. Consultation with the Co-operative Program Administrator is essential where regulations and procedures for the Co-operative stream are an issue. It is the student's responsibility to ensure that his/her student file is current and correct.

Work Term Assessment

Successful completion of a work term is achieved by the submission of a satisfactory work-term report and receipt of a satisfactory evaluation from the employer.

Students are expected to submit a written work-term report at the end of each work term. During a double work term a student is expected to complete a report after four months as well as a final report. Employers may require additional reports from students as part of the job. Normally, for a report to be considered it must have been written during the work term and be related to or evoked by the work-term activity. In addition, co-operative students will be assessed on their performance in the work-place by their supervisor, the assessment being reported to the School.

An unsatisfactory work term report or a poor assessment in the work-place will not affect the academic progress of a student but may result in a student being required to withdraw from the co-operative education stream.

Students are normally expected to complete the full complement of five work terms in the prescribed academic term/work term sequence. With prior approval from the Co-operative Program Administrator, however, allowance can be made for personal considerations, educational opportunities, and other extenuating circumstances. For these students, and for students given advanced admission to the Co-operative program, a minimum of four work terms must be successfully completed before graduation.

Work-Term Reports

Work-Term Reports are graded as Satisfactory or Unsatisfactory. Work-term report grades will be recorded on a student's transcript under the appropriate work-term report course number. Provision is made for students to upgrade Unsatisfactory work reports for re-evaluation by the beginning of the student's next academic term. Students who fail to submit a work report or who fail to upgrade an Unsatisfactory work report will have a work-term failure recorded on their Co-operative Student Record.

The School provides a common set of written guidelines for all work-term reports. Work-term reports are evaluated and graded by a faculty member.

Employer Performance Evaluations

Evaluation grades are recorded on the "Employer Evaluation of Co-operative Student" form. The student should ensure that the employer has sent a completed evaluation to the University. An unsatisfactory evaluation is investigated by the Co-operative Program Administrator and will normally result in a work-term failure being recorded on the Co-operative Student Record. Employer evaluation grades are not recorded on a student's transcript.

Voluntary Withdrawal from the Co-operative Stream

Students may withdraw from the Co-operative education stream without penalty. Such students are eligible to continue in the regular B.C.S. program provided they meet the academic standards required for continuation in this program.

Required Withdrawal from the Co-operative Stream

Students may be required to withdraw from the co-operative education stream if they fall into one or more of the following categories:

- failure to meet the academic standards required for continuation in the co-operative education stream (see pp. 268-270);
- failure to submit a work term report;
- submission of an unsatisfactory work term report or receipt of an unsatisfactory employer evaluation;
- dismissal with cause by an employer;
- failure to report to an employer or leaving an employer without prior approval;
- independent search for a work placement by a student who has previously elected to take part in the normal application and interview process arranged by the School;
- missing a pre-arranged interview with an employer;
- failure to obtain approval to delete a previously ranked job choice;
- failure to obtain approval to not return for a second consecutive work term.

Standing and Appeals

The Co-operative Program Administrator administers the regulations and procedures applicable to the Co-operative program and will report any instance of a student failing a work term or being required to withdraw from the Co-operative stream for any reason to the School Committee on Admissions and Studies for a final decision. The student is notified by letter of the final decision made by the Committee. The decision may be appealed through the normal appeal channels within the University.

Combined Honours B.Sc. Programs

A Combined Honours program must include a minimum of six credits in Computer Science. These requirements can be satisfied as follows:

Computer Science and Mathematics

Students in this program follow the prescribed Combined Honours B.Sc. program outlined on p. 389. The program features equal emphasis on Mathematics and Computer Science.

Computer Science and Physics

Students in this program follow the prescribed Combined Honours B.Sc. program outlined on p. 405. The program

features equal emphasis on Physics and Computer Science.

Introductory Courses

Of the eight 100-level half courses offered in Computer Science, five are entry-level courses, viz., Computer Science 95.100★, 95.101★, 95.103★, 95.105★ and 95.140★. The remaining, viz., Computer Science 95.102★, 95.106★ and 95.185★ are second-level courses and should not be attempted unless one of the entry-level courses has been successfully completed.

With respect to the entry-level courses, students are expected to take only one. Specifically, students in the B.C.S. program or in a combined Computer Science program should note that credit will not be given for more than one of Computer Science 95.100★, 95.101★, 95.103★, 95.105★ or 95.140★. In selecting an entry-level course, students should take into account the following:

1. Computer Science 95.100★ is designed specifically for Arts students and may not be taken for credit by students in Computer Science, Science or Engineering.
2. Computer Science 95.101★ is designed specifically for Social Science students and may not be taken for credit by students in Computer Science, Science or Engineering.
3. Computer Science 95.103★ is designed specifically for Science students and requires a sound preparation in mathematics.
4. Computer Science 95.105★ and 95.140★ are special entry-level courses designed specifically for students in Computer Science and Business, respectively. These are not stand-alone courses and should, therefore, not be chosen by students who are not committed to further studies in these disciplines.

Computer Science Course Selection

The following table is designed primarily for B.C.S. students, to assist in both option and course selection. Since it is organized by specialization option, the table will also be useful to students in Combined Honours programs as well as to students seeking a concentration in Computer Science within some other degree program. The table contains only Computer Science courses beyond the 100 level.

Legends:

X - required course

0 - specified optional course

★ - unspecified course of particular interest

Notes:1. This chart does not show 100-level courses. See section entitled *Introductory Courses*, p. 271.2. This chart does not include relevant courses offered by the School of Business or the Faculty of Engineering. A list of these courses can be found in the section entitled *Relevant Courses*, p. 267.

Course	Option				
	Software	Hardware	Theory of Computing	Scientific Applications	Management and Business systems
95.202★ Data Structures and Data Types	X	X	X	X	X
95.203★ Computer Organization	X	X	X	X	X
95.204★ Programming in the Large	X	X	X	X	X
95.206★ Digital Logic	★	X	0	X	0
95.207★ Programming Language Concepts	X	★	0	★	0
95.300★ Operating Systems	X	X	X	X	X
95.302★ Compiler Construction	X	★	0	★	
95.304★ Software Systems Design	X	X	X	X	X
95.305★ Database Management Systems	X	X	X	X	X
95.306★ Microprocessor Interfacing	★	X		X	
95.384★ Data Structures and Algorithm Analysis	X	X	X	X	X
95.385★ Discrete Structures and Applications	X	X	X	X	X
95.386★ Numerical Analysis	0	0	0	X	0
95.387★ Mathematical Software	★		★	0	
95.401★ Concurrent Programming	X	★	0	★	★
95.402★ Computer Graphics	★	★		★	★
95.403★ Transaction Processing Systems	★	★			X
95.404★ System Software	★	0		★	★
95.405★ A First Course in Robotics and Computer Vision	★	★	★	★	
95.407★ Applied Artificial Intelligence	★		★		
95.483★ Computable Functions			0		
95.484★ Design and Analysis of Algorithms	X	★	X	0	★
95.485★ Theory of Automata	★		X		
95.486★ Numerical Linear Algebra			0	0	
95.490★ Advanced Topics in Computer Science	★	★	★	★	★
95.491★ Directed Studies	★	★	★	★	★
95.495★ Honours Project	X	X	X	X	X

Academic Standing

Grading System

Standing in courses will be shown by alphabetical grades. The grades used, with their corresponding grade points, are as follows:

A+	12	B+	9
A	11	B	8
A-	10	B-	7
C+	6	D+	3
C	5	D	2
C-	4	D-	1

Standings to represent special circumstances are as follows:

Aeg

Pass standing granted although absent from final examinations. Aegrotat standing is granted only by the School of Computer Science Committee on Admission and Studies in response to a student's written request. It will be granted only in exceptional circumstances and if the term work has been of high quality.

Ch

Credit granted under the Challenge for Credit policy.

F

Failure. No academic credit.

FNS

Failure, but with supplemental privileges withdrawn because of unsatisfactory term work or an unacceptably low mark in the examination. No academic credit.

Wdn

Withdrawn in good standing. No academic credit.

Abs

Failure due to absence from the final examination where the necessary term work has been completed. No supplemental privileges. No academic credit.

Def

Students who are absent from final examinations or who are unable to complete their course work for medical or compassionate reasons may apply to the School of Computer Science Committee on Admission and Studies for deferred examination privileges.

IP

In progress.

Sat

Satisfactory

Uns

Unsatisfactory

Computation of Averages

Using the 12-point system set out above, the grade points earned in any specific course are determined by multiplying the grade points corresponding to a grade by the credit value of the course. Grade-point averages are calculated by dividing the total accumulated grade points by the total

credits. Overall averages are calculated on the grades earned in all courses applicable to the degree. Computer Science grade-point averages involve only those courses listed or cross-listed as Computer Science and those courses offered by the School of Business and the Faculty of Engineering that are counted as Computer Science credits. A list of these courses can be found in the section entitled *Relevant Courses*, p. 278. Work Term Report Courses are not included in the computation of averages.

Unless otherwise indicated, courses are one full credit, indicated 1.0 on all record documents. Courses marked ★ are half-credit courses, indicated 0.5 on documents.

Course Load

The normal course load for a full-time student in the School of Computer Science, during the Fall/Winter session, is the equivalent of five credits. The normal maximum course load for a part-time student, in the Fall/Winter session, is the equivalent of two credits.

Students may register for a maximum of two credits in the Summer session.

A student in good standing may exceed the normal course load only with the recommendation of the Director of the School of Computer Science.

Promotion from First Year

Full-time students in First year, in order not to fail their year in May, must, by then, have passed at least three credits or equivalent. To be promoted to the course-credit system, a full-time student must pass, by the end of August, at least four credits from the First year of his or her chosen option, including at least one credit in Computer Science, with a grade-point average of 6.5 or better in Computer Science courses and at least 5.0 overall. (Grade-point averages are to include any failing grades.) Part-time students must meet the same grade-point standards and pass at least four of the first six approved credits attempted.

For all students, promotion to the course-credit system must be accomplished in not more than three calendar years from the date of first registration in the B.C.S. program.

A student who fails to meet these promotion requirements is deemed to have failed First year and must forfeit credit for courses with grades of less than C- and is required to withdraw from the B.C.S. program. Such students are eligible to re-apply for admission and, if admitted, will repeat First year without encumbrances, retaining credit towards their degree (but not towards completion of First year) for all courses graded C- or better. A student who fails First year a second time forfeits his or her undergraduate status in the B.C.S. program and is ineligible for any further registration in the B.C.S. program.

Course Credit System

Students meeting promotion requirements at the end of First year will proceed on the course-credit system. Under this system there is no promotion from one year to the next.

After promotion to the course-credit system, a student may accumulate a maximum of three credits in supplemental examinations, grade-raising examinations, repeated courses, course replacements.

To continue in the B.C.S. program, a student must, by the end of August each year, have gained credit in the past 12 months towards the B.C.S. degree and have a cumulative grade-point average of 6.5 or better in Computer Science courses and 5.0 or better overall. (Grade-point averages

are to include any failing grades.) Failure to comply with these standards requires withdrawal from the program. Such students may, however, be eligible to transfer into another degree program. Guidance of the Registrar of the School of Computer Science should be sought in such cases.

To continue in the Co-operative stream of the Bachelor of Computer Science program, a student must, by the end of August each year, have gained at least two academic credits (other than work term report credits) during the past 12 months towards the B.C.S. degree and have a cumulative grade-point average of 8.0 or better in Computer Science and 6.5 or better overall; (grade-point averages are to include any failing grades). Failure to meet these standards requires withdrawal from the Co-operative stream. Students required to withdraw from the Co-operative stream are eligible to continue in the regular Bachelor of Computer Science program provided they meet the academic standards required for continuation in this program.

Examinations

General regulations on examinations are on p. 39. In addition, the following regulations apply to students in the B.C.S. program.

Supplemental Examinations

Students may request a supplemental examination in a course graded *F*. Application to write supplemental examinations must be made at the School of Computer Science Registrar's Office by the designated date.

Deferred Examinations

Students unable to write a final examination because of illness or for compassionate reasons may apply within one week after the final examination to the School of Computer Science Registrar's Office for permission to write a deferred examination. Permission can be granted only if the absence is fully and specifically supported by a medical certificate or other documents.

Grade-Raising Examinations

A student may apply to the School Registrar's Office to write a grade-raising examination in a course already passed. The grade received on this examination will supersede the previous grade whether it is higher or lower.

Graduation

University Graduation Requirements

See pp. 38-39.

Application to Graduate

Students expecting to graduate in the Spring must make application on the form available in the School Registrar's Office by February 1; those expecting to graduate in the Fall, by September 1; and those expecting to graduate in February, by December 1.

Graduation Requirements

To qualify for graduation with a Bachelor of Computer Science degree with Honours a student must:

1. present at least 20 approved credits beyond Qualifying University year, including at least 13 credits at the 200 level or higher;
2. meet the program requirements of the School of Computer Science for at least one of the B.C.S. program options;
3. meet the minimum grade-point standards for Honours as stated below;
4. complete the program within seven calendar years of the entry to the course credit system;
5. be recommended by the School Council and the Faculty Board of the School of Computer Science.

To qualify for graduation with a Bachelor of Computer Science degree with Honours and Co-operative degree designations a student must:

1. present at least 22 approved credits beyond Qualifying University year, including at least 15 credits at the 200 level or higher;
2. meet the program requirements of the School of Computer Science for at least one of the B.C.S. program options;
3. meet the minimum grade-point standards for Honours as stated below;
4. complete the program within seven calendar years of the entry to the course credit system;
5. successfully complete a minimum of four work terms;
6. be recommended by the School Council and the Faculty Board of the School of Computer Science.

Designations of Honours Degrees

Three designations of Honours are awarded, determined on the basis of the grade-point average as follows:

Highest Honours

10.0 - 12 in Computer Science courses, and
8.0 or better overall

High Honours

9.0 or better in Computer Science courses, and
7.0 or better overall

Honours

6.5 or better in Computer Science courses, and
5.0 or better overall

Co-operative Degree Designation

Graduates successfully completing the requirements for graduation from the Co-operative Education Stream will receive a *Co-operative* degree designation in addition to the Honours designation.

Courses Offered

Some of the following Computer Science courses are cross-listed from other parts of the Calendar. In every such case, only one course is actually offered and the two numbers are alternate identifiers for this single course. Students in the B.C.S. program should register in such a course under the Computer Science (95) number.

Note:

In all courses with programming assignments, students usually find it necessary to be on campus at other than the

scheduled lecture periods to make use of computing facilities.

Computer Science 95.100★

Introduction to Computers for the Humanities

This course is intended to give students in the humanities a working knowledge of computers and their uses: computer fundamentals; use of computing facilities; programming in a high level language; uses of computers in the humanities; information management.

Precludes additional credit for Computer Science 95.101★ and 95.140★.

This course cannot be taken for credit by students in Engineering, Science, or Computer Science.

Day division, Fall term: Lectures three hours a week.

Computer Science 95.101★

Introduction to Computers for the Social Sciences

This course is intended to give students in the social sciences a working knowledge of computers and their uses: computer fundamentals; use of time-sharing facilities. Programming in a high level language.

Precludes additional credit for Computer Science 95.100★ and 95.140★. This course cannot be taken for credit by students in Engineering, Computer Science or Science.

Day division, Fall term; Day and Evening divisions, Winter term: Lectures three hours a week.

Computer Science 95.102★

Introduction to Computers

This course is designed to introduce the student to the organization and operation of computer systems. Concepts of machine and assembly languages are explained. Lectures and programming exercises cover such topics as: addressing modes, subroutine calling conventions, internal data representation.

Prerequisite: One of Computer Science 95.101★, 95.103★, 95.105★ or 95.140★.

Day division, Fall term; Day and Evening divisions, Winter term: Lectures three hours a week.

Computer Science 95.103★

Introduction to Scientific Computing

A first course in computer programming primarily for students in the Faculty of Science. Introduction to computers and algorithms. Use of the Carleton time-sharing system. Introduction to FORTRAN programming through examples taken from mathematics and science. Basic procedures: summing, sorting, looping. Iterative solutions to problems. Non-numeric programming. Random numbers. Simulation of simple physical systems. The computer system: inside the computer. Use of the batch system. Efficient and structured programming.

Precludes additional credit for Engineering 94.165.

Prerequisites: One of Mathematics 69.107★, 69.117★, 69.127★, 69.102, 69.112, which may be taken concurrently.

Day and Evening divisions, Fall term; Evening division, Winter term: Lectures three hours a week.

Computer Science 95.105★

Introduction to Programming

A first course in problem solving and computer programming designed for students who wish to specialize in Computer Science. Topics include: programming style; procedural abstraction; data abstraction; testing; a variety of numeric, non-numeric, and graphical applications.

Precludes additional credit for Engineering 91.166★.

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week and one hour tutorial.

Computer Science 95.106★

Computer Applications

A continuation of Computer Science 95.105★ designed to give students more experience in numeric and non-numeric programming through case studies. The emphasis is on teaching fundamental computational concepts through design and implementation of application programs covering a range of application areas such as: text processing; symbolic manipulation; file processing; numerical methods. Prerequisite: Computer Science 95.105★ or (with self-study of the programming language used) one of Computer Science 95.101★, 95.103★ or 95.140★, and a 100-level course in calculus which may be taken concurrently.

Evening division, Fall term; Day and Evening divisions, Winter term: Lectures three hours a week.

Computer Science 95.140★

Introduction to Computers for Business Students

An introduction to the use of computers in problem solving and data processing. Algorithms for file handling, report generations, elementary numerical computations in business. Information flows within business, fundamentals of programming for business applications. Students will prepare and execute interactive programs to solve problems in the course. (Also listed as Business 42.140★.) Precludes additional credit for Computer Science 95.100★ and 95.101★.

Prerequisite: Mathematics 69.109★ or equivalent (grade of C- or better).

Day division, Winter term: Lectures three hours a week.

Computer Science 95.185★

Introduction to Discrete Structures

An introduction to the discrete mathematics and discrete structures of computer science, providing an overview of the major strands in theoretical computer science. The following topics are introduced: propositional and predicate calculus, combinatorial counting and recurrence relations, graphs, and formal language theory, automata theory, computability. (Also listed as Mathematics 69.185★.)

This course is available to Science students only as a free option.

Prerequisites: Two OACs in Mathematics courses; and one of Computer Science 95.105★ or 95.103★, (which may be taken concurrently).

Day division, Fall and Winter terms: Lectures three hours a week.

Computer Science 95.202★

Data Structures and Data Types

A course designed to provide in-depth experience in the design and construction of computer programs involving data structures. The data structures, including stacks, queues, lists, trees and records are presented from the viewpoint of the data type programming concept.

Precludes additional credit for Engineering 94.202★.

Prerequisite: Computer Science 95.106★.

Day division, Fall and Winter terms: Lectures three hours a week.

Computer Science 95.203★

Computer Organization

A thorough treatment of computer system organization. Micro, mini and mainframe architectures. Instruction sets and addressing modes. Input/output methods and devices. Micro-coded interpreters. Operating system functions, virtual I/O and memory management techniques.

Precludes additional credit for Engineering 94.303★ for students in the Computer Science program and in combined programs with Mathematics or Physics.

Prerequisite: Computer Science 95.102★ or Engineering

94.165.

Day division, Fall and Winter terms: Lectures three hours a week.

Computer Science 95.204★

Programming in the Large

Introduction to the problems of developing complex software systems: software life cycle; structured design and programming; functional decomposition; table-driven programming; object-oriented programming; language support for modular programming, testing, and debugging. Assignments stress both design and implementation issues and make use of a variety of high-level programming languages and tools.

Prerequisite: Computer Science 95.106★.

Day division, Fall and Winter terms: Lectures three hours a week.

Computer Science 95.206★

Digital Logic

Fundamental concepts in digital logic; Boolean algebra, gates, flip-flops, combinatorial networks, fundamentals of minimization, sequential finite state machines, counters, and registers.

Prerequisite: Computer Science 95.102★.

Day division, Winter term: Lectures three hours a week, laboratory three hours a week.

Computer Science 95.207★

Programming Language Concepts

An introduction to the study of programming languages emphasizing language semantics. Detailed study of the fundamentals of several important programming languages involving procedural, functional, logic, and object-oriented programming paradigms.

Prerequisite: Computer Science 95.202★ or Engineering 94.202★.

Day division, Winter term: Lectures three hours a week.

Computer Science 95.300★

Operating Systems

A first course in operating systems stressing fundamental issues in design: process management; memory management; process co-ordination and synchronization; inter-process communication; real-time clock management; I/O device drivers; file systems; frame-level network communication. Assignments involve the use, modification, and extension of a multitasking operating system.

Prerequisite: Computer Science 95.202★ or Engineering 94.202★.

Prerequisite: One of Computer Science 95.203★ or Engineering 94.203★.

Day division, Fall term: Lectures three hours a week.

Computer Science 95.302★

Compiler Construction

The structure, organization and design of the phases of a compiler are considered: lexical translators, syntactical translators, scope handlers, type checkers, code generators and optimizers. Components of a compiler will be implemented.

Prerequisite: Computer Science 95.202★ or permission of the School.

Day division, Fall term: Lectures three hours a week.

Computer Science 95.304★

Software Systems Design

This course is primarily concerned with the non-programming aspects of the construction of large software systems: requirements specification; software design

methodologies; hardware/software selection; high-level development tools; documentation (functional specification, user manuals, on-line manuals); configuration management (test plans, programming standards, release control); project management (project plans and schedules, programming teams, structured walkthroughs, estimating time and costs).

Prerequisite: Computer Science 95.204★.

Prerequisite: Computer Science 95.204★.

Day division, Winter term: Lectures three hours a week.

Computer Science 95.305★

Database Management Systems

Introduction to database concepts. Data models: hierarchical, network, relational, infological, entity-relationship, binary logical association. Data description languages; query facilities. The relational model: relational algebra, relational calculus, normalization. Implementation issues. Security, integrity, reliability. Advanced concepts. Use will be made of available DBMSs.

Prerequisite: One of Computer Science 95.202★ or Engineering 94.202★.

Prerequisite: One of Computer Science 95.204★ or Engineering 94.203★.

Day division, Fall and Winter terms: Lectures three hours a week.

Computer Science 95.306★

Microprocessor Interfacing

A laboratory-oriented course to acquaint students with the design and construction of small-scale microprocessor-based systems. Topics to be covered include: microcomputer structures, microprocessor selection, memory designs and interfaces, I/O devices and interfaces, microprocessor bus standards, serial standards, integration of hardware and firmware, microcontrollers and A/D conversion. Lectures are augmented by laboratory periods providing practical, hands-on experience in microprocessor interfacing.

Prerequisite: Computer Science 95.203★ and 95.206★ or equivalent.

Day division, Winter term: Lectures three hours a week, laboratory three hours a week.

Computer Science 95.320★

Co-operative Work Term Report 1

Prerequisites: Registration in the Co-operative Education Stream of the Bachelor of Computer Science program and permission of the School.

Computer Science 95.321★

Co-operative Work Term Report 2

Prerequisites: Registration in the Co-operative Education Stream of the Bachelor of Computer Science program and permission of the School.

Computer Science 95.322★

Co-operative Work Term Report 3

Prerequisites: Registration in the Co-operative Education Stream of the Bachelor of Computer Science program and permission of the School.

Computer Science 95.384★

Data Structures and Algorithm Analysis

Review of basic data structures such as stacks, queues and lists. Algorithms for their implementation. Representation of arrays, sets and relations. Trees and graphs – representation and applications. Basic techniques of design and analysis of efficient algorithms for sorting and searching.

Hashing, dynamic storage allocation, garbage collection. (Also listed as Mathematics 69.384★.)

Prerequisites: A 200-level Mathematics course and Computer Science 95.202★.

Day division, Fall and Winter terms: Lectures three hours a week.

Computer Science 95.385★

Discrete Structures and Applications

Enumeration: elementary methods, inclusion and exclusion, recurrence relations, generating functions and applications. Graph theory and algorithms: connectivity, planarity, Hamilton and Euler paths. Error-correcting codes. (Also listed as Mathematics 70.385★.)

Prerequisite: One of Mathematics 69.218★, 70.210 or 69.311★.

Day division, Fall and Winter terms: Lectures three hours a week and one hour tutorial.

Computer Science 95.386★

Numerical Analysis

Elementary discussion of error, polynomial interpolation, quadrature, linear systems of equations and matrix inversion, non-linear equations, difference equations and ordinary differential equations. (Also listed as Mathematics 69.386★.)

Prerequisites: Computer Science 95.103★ or 95.106★, Mathematics 69.102 or 69.207★ (or 69.201 or 69.202) and 69.112 or 69.217★.

Evening division, Fall term: Lectures three hours a week and one hour tutorial.

Computer Science 95.387★

Mathematical Software

Incorporation of basic numerical methods into efficient, reliable software. The course includes examination of existing software systems, e.g. linear systems, non-linear systems, optimization, or differential equations. (Also listed as Mathematics 69.387★.)

Prerequisite: Computer Science 95.386★.

Evening division, Winter term: Lectures three hours a week and one hour tutorial.

Computer Science 95.401★

Concurrent Programming

Sequential processing, coroutines and backtracking are introduced as special cases of concurrent processing. The more general concept is then investigated. Topics include the process concept, low-level and high-level process synchronization primitives, Petri nets, message passing, data-driven versus control-driven program execution. Emphasis is placed on applications in such areas as the parallel evaluation of expressions, real-time transaction systems, fault-tolerant computing and operating systems.

Prerequisites: Computer Science 95.300★.

Day division, Fall term: Lectures three hours a week.

Computer Science 95.402★

Computer Graphics

This course is designed to give students an introduction to the basic principles and techniques of computer graphics: Overview of graphics hardware, techniques for defining images; point, vector and raster approaches. Image transformations; scaling, translation, rotations, clipping, windowing. Graphics software and data structures. Input devices and techniques for interactive graphics. Raster graphic systems. An introduction to three-dimensional graphics; transformations, perspective, hidden line removal. Applications of computer graphics.

Prerequisites: Computer Science 95.384★ or both En-

gineering 94.202★ and 94.303★.

Day division, Winter term: Lectures three hours a week.

Computer Science 95.403★

Transaction Processing Systems

This course investigates the design and implementation of on-line data base intensive transaction processing systems. The functional components of a transaction processing system are examined, tracing the transaction flow from user terminal input to user terminal response. Case studies of current systems are used to illustrate design alternatives and implementation techniques. Topics covered in the course include: data entry – the user/terminal interface; teleprocessing – the terminal/host interface; TP monitors – the operating system/application interface; transaction design; journaling and recovery.

Prerequisites: Two of Computer Science 95.204★, 95.305★, Engineering 94.304★.

Day division, Fall term: Lectures three hours a week.

Computer Science 95.404★

Systems Software

A thorough examination of system software from the user and designer points of view: use of O/S system calls; user interfacing, system utilities; command interpreters, system customization; software production tools, data communications, file management and recovery. Examples are drawn from, and extensive practical use is made of, existing popular computer systems.

Prerequisite: Computer Science 95.300★ or Engineering 94.401★.

Not offered 1990-91.

Computer Science 95.405★

A First Course In Robotics and Computer Vision

An introductory course in robotics and computer vision emphasizing fundamental concepts: comparative study of robot programming languages; Find Space problem; Find Path problem; boundary tracking; depth finding; edge detecting.

Prerequisites: Computer Science 95.202★, Mathematics 69.208★ and Physics 75.100.

Day division, Winter term: Lectures three hours a week.

Computer Science 95.407★

Applied Artificial Intelligence

A course emphasizing artificial intelligence techniques and programming. The course investigates selected topics via prototypes that illustrate the basic notions. Sample topics include: pattern matching and query systems; mobile robots and navigation; connectionist systems and learning; constraint systems; rule-based systems; natural language processing; speech acts; planning systems.

Prerequisite: Computer Science 95.207★.

Day division, Fall term: Lectures three hours a week.

Computer Science 95.420★

Co-operative Work Term Report 4

Prerequisites: Registration in the Co-operative Education Stream of the Bachelor of Computer Science program and permission of the School.

Computer Science 95.421★

Co-operative Work Term Report 5

Prerequisites: Registration in the Co-operative Education Stream of the Bachelor of Computer Science program and permission of the School.

Computer Science 95.483★

Computable Functions

Recursive functions and computability, algorithms, Church's thesis, Turing machines, computational logic. (Also listed as Mathematics 70.483★.)

Prerequisite: Mathematics 70.210 or Computer Science 95.385★ or permission of the School.

Day division, Winter term: Lectures three hours a week.

Computer Science 95.484★

Design and Analysis of Algorithms

Design techniques: divide-and-conquer, backtracking, dynamic programming, search methods. Algorithms for graph problems, optimization problems, algebraic problems. Lower bounds and the P-NP question. (Also listed as Mathematics 70.484★.)

Prerequisite: Computer Science 95.384★ or permission of the School.

Day division, Fall term: Lectures three hours a week.

Computer Science 95.485★

Theory of Automata

Finite automata and regular expressions, properties of regular sets, context-free grammars, pushdown automata, deterministic context-free languages. Turing machines, the Chomsky hierarchy. Undecidability, intractable problems. (Also listed as Mathematics 70.485★.)

Prerequisite: Computer Science 95.385★ or Mathematics 70.310 or permission of the School.

Day division, Winter term: Lectures three hours a week.

Computer Science 95.486★

Numerical Linear Algebra

Study of matrix inversion techniques; techniques of finding eigenvalues and eigenvectors, solution of systems of linear equations; direct and indirect methods, their comparison and error analysis; applications in optimization and other areas. (Also listed as Mathematics 70.486★.)

Prerequisites: Mathematics 69.217★; and 69.309★ or permission of the School.

Day division, Winter term: Lectures three hours a week.

Computer Science 95.490★

Advanced Topics In Computer Science

Selected topics in Computer Science offered by members of the School of Computer Science.

Prerequisite: Permission of the School.

Day division, Fall and Winter terms: Lectures three hours a week.

Computer Science 95.491★

Directed Studies

A course of independent study under the supervision of a member of the School of Computer Science, open only to students in the B.C.S. program. Students are required to obtain their supervisor's written approval prior to registration and are limited to two such courses in their programs. Prerequisite: Permission of the School of Computer Science.

Computer Science 95.495★

Honours Project

As part of the Fourth-year program, each B.C.S. student is required to select and complete a major project in computer science. Students are required to submit written project proposals to the Honours Project Co-ordinator for approval on or before November 1 of their final academic year.

Prerequisite: Registration in either the Bachelor of Computer Science program or one of the Combined Honours programs involving Computer Science and the permission of the School.

Other Relevant Courses Offered

The following courses are not offered by the School of Computer Science but are relevant to the study of computer science. They may be taken for credit as computer science courses in the B.C.S. program and the combined programs with Computer Science. For full descriptions of these courses please refer to the Calendar entries of the School of Business and the Department of Systems and Computer Engineering.

• **Courses Offered by the School of Business:**

Business 42.230★

Introduction to Management Science

Business 42.240★

Business Information Systems

Business 42.342★

Business Systems I

Business 42.348★

Quantitative Applications of Computers in Business

Business 42.440★

Management Information Systems

Business 42.442★

Business Systems II

Business 42.446★

Decision Support Systems

• **Courses Offered by the Faculty of Engineering**

Engineering 94.333★

Advanced Real-Time Programming

Engineering 94.405★

Discrete Simulation and its Applications

Engineering 94.457★

Introduction to the Architecture of Computer Systems

Officers of the Faculty

Dean

J.S. Riordon

Associate Dean

M.J. Bibby

Assistant Dean

J. Gordon Forth

Faculty Registrar

Richard L. Fleming

Departmental Chairmen

Civil Engineering

A.P.S. Selvadurai

Electronics

J.S. Wight

Mechanical and Aerospace Engineering

R.J. Kind

Systems and Computer Engineering

S.A. Mahmoud

Bachelor of Engineering Degree Program

The Bachelor of Engineering degree is awarded on successful completion of a four-year program of studies with specialization in Aerospace, Civil, Electrical, Mechanical or Computer Systems Engineering. The four-year program comprises common core material emphasizing fundamental mathematical, physical and engineering sciences followed by further study in one of the five programs. Several specializations are possible within each Program Option. In Aerospace Engineering, students may select a specialization in Aerodynamics, Propulsion and Vehicle Performance; Aerospace Structures, Systems and Vehicle Design; or Aerospace Electronics and Systems. In Civil Engineering, students may choose either the Program Option or they may choose a Concentration in Management; in Electrical Engineering, students may choose a General Stream or they may specialize in Electronics, Systems, or Telecommunications, or a Concentration in Management; in Mechanical Engineering, students choose either the Program Option or a Concentration in Management or a concentration in Computer Integrated Manufacturing.

The entire undergraduate engineering program was revised in 1987. Students admitted in 1987-88 or later will follow the program as it appears in this Calendar. However, students admitted in 1986-87 or earlier must follow the original program as it appeared in the Calendar of date of entry. Should an individual student encounter program difficulties due to the implementation of the revised curriculum, arrangements will be made by the Faculty of Engineering to ensure that such a student is able to follow an equivalent program of study.

Licensing, Registration and Accreditation

Licensing and registration are key words for doctors, for lawyers and for engineers. To practise engineering in

Canada as a professional (P. Eng.), a person must be registered (licensed) with his or her provincial or territorial professional engineering association.

In 1965, the Canadian Council of Professional Engineers (C.C.P.E.) established the Canadian Engineering Accreditation Board (C.E.A.B.). This board develops standards for engineering degree programs in Canadian universities and monitors the application of these standards to ensure engineering graduates meet the educational requirements of the profession. Graduates from a C.E.A.B.-accredited program meet the educational requirements for registration in any one of the C.C.P.E.'s 12 federated associations. Most Carleton engineering graduates become registered and licensed with the Association of Professional Engineers of the Province of Ontario (A.P.E.O.).

The Civil, Electrical, Mechanical and Computer Systems Bachelor of Engineering degree programs at Carleton are accredited by the Canadian Engineering Accreditation Board. In addition, the new Aerospace Engineering program has been designed for accreditation.

Admission Requirements

Qualifying-University Year

The Ontario Secondary School Graduation Diploma. A 70-percent average must be presented on a minimum of 10 Advanced credits at Grades 11 and 12, including an appropriate preparation in Chemistry, Physics and Grade 12 Mathematics.

First Year

The Ontario Secondary School Diploma including at least six Ontario Academic Courses with a minimum of 65 percent. The six OACs must include the courses Calculus, Algebra and Geometry, Chemistry and Physics with a minimum of 65 percent average in these core courses. It is strongly recommended that the remaining Ontario Academic Courses include at least one in English or Français.

A student unable to meet the foregoing specific course requirements but otherwise admissible to Carleton University may be admitted, but will be required to satisfy the outstanding requirements at the Qualifying-University-year level.

Engineering students are required to make extensive use of computers, and some background in this area prior to admission is a definite asset. For those students who have had little or no computer experience, Carleton offers special instruction during orientation week (first week of the Fall term).

Enrolment Limitation

Applicants should note that in view of limited human and physical resources, meeting the admission requirements can only establish eligibility for selection to the Faculty of Engineering.

Each student offered admission to the Faculty of Engineering will have a place reserved in at least one of the specialized Program Options: Aerospace, Civil, Computer Systems, Electrical, or Mechanical Engineering; this will be confirmed in the letter offering admission. Transfer from one Program Option to another, requested after admission, will be permitted wherever possible. However, the Faculty

of Engineering reserves the right to restrict enrolment in each of the foregoing Program Options.

Advanced Standing

Applications for admission with advanced standing to the program leading to the Bachelor of Engineering degree will be evaluated on an individual basis.

Successful applicants will have individual academic subjects, completed with grades of at least C- or equivalent, evaluated for academic standing, provided the academic work has been completed at another university or degree-granting college or in another degree program at Carleton University.

The Faculty of Engineering does not normally accept, for transfer, courses that have been assessed as Science courses and that might be used towards the Fourth-year Engineering/Science elective requirements, since the final year of study must be completed in the Bachelor of Engineering program at Carleton University.

Mature Applicants

Persons who lack the normal entrance requirements as published in this Calendar but who have been away from full-time studies for a minimum of two years and are 21 years of age or over, by December 31 of the year in which they wish to enrol, may receive consideration for admission to a degree program. See Admissions Section, p. 28 for detailed information.

English Proficiency Requirements

English Placement Test

The University policy governing applicants whose mother tongue is a language other than English is given on p. 24.

Engineering Summer Report

All students entering Second year of an Engineering program must submit a Summer Report, Engineering 91.200. The Summer Report is normally written on a topic assigned by the Faculty. It should range from 3,000 words minimum to 5,000 words maximum and is due on the first day of classes for the Fall term. Engineering 91.200 is a course with a 0.0 credit value; it carries an Engineering weight of 2.

Industrial Experience Program

Students with a cumulative grade-point average of 7 or higher may apply to the Industrial Experience program. Subject to the availability of positions, suitable students may be placed in industry, government, for a period of either 16 months beginning in May following the Third year of the program (May through September to the following September); or for 12 months beginning in January of the Third year of the program (January to January of the following year). Applications must be made in writing to the relevant Departmental Chairman before September 1 of Third year for the 12-month option or before December 1 of Third year for the 16-month option.

Engineering Common Core

First Year	Lectures and Tutorials		Laboratory and Problem Analysis		Course Weight
	Fall	Winter	Fall	Winter	
65.111★ Chemistry for Engineering Students	3	—	3	—	6
75.100 Introductory Physics	3	3	3	3	10
69.104★ Calculus for Engineering Students	4	—	—	—	5
69.114★ Algebra for Engineering Students	—	4	—	—	5
91.111★ Mechanics-Statics	—	3	—	3	6
91.101★ Engineering Graphics	2	—	4	—	5
91.102★ Orientation to Engineering	—	2	—	4	5
91.166★ Structured Problem Solving and Computers	3	—	1	—	5
91.167★ Computers and Applications	—	3	—	1	5
Elective, Humanities or Social Sciences	3	3	—	—	7
	18	18	11	11	59

Concentration in Management

Students in Civil, Electrical, or Mechanical Engineering have the opportunity to undertake a "Concentration in Management" within their degree program. Among other things, the Management Concentration provides direct entry to the Masters of Management Studies program (MMS degree) offered by the School of Business. Engineering students will be particularly interested in this program because it emphasizes the management of technology.

With this emphasis, the MMS is an attractive alternative to traditional MBA programs offered by other schools.

The Concentration in Management is designed to provide students with an understanding of the issues, concepts and techniques in the management of technology and resources. It aims to impart to them enhanced problem-solving skills and should help to widen the scope of their employment.

A student who wishes to follow the Management Concentration must declare his or her intent with the Registrar at the beginning of Second year. Students who successfully complete the concentration will receive an entry "Concentration in Management" on their transcripts.

The Concentration in Management consists of the following courses: Business 42.101★, Principles of Financial Accounting; Business 42.102★, Management Accounting; Engineering 91.380★, Engineering Economics; Mathematics 69.352★, Probability and Statistics; Business 42.210★ Management and Organizational Behavior; Engineering 94.320★, Industrial Engineering; Engineering 90.460★, Engineering Applications of Operations Research; Engineering 90.461★, Principles of Finance; and Engineering 90.462★, Organizational Behaviour II. Spreadsheets showing the concentration pattern for each discipline are contained in the booklet, *A Guide to the Engineering Program*.

Aerospace Engineering Program

Aerospace Engineering covers a wide variety of applications ranging from aircraft aerodynamics, structures and propulsion to the complete design and systems integration of air and space vehicles. The main disciplines relating to airframes, propulsion and space platforms are solid mechanics and materials, fluid mechanics and thermosciences; the topic areas are basically the same as for Mechanical Engineering, with a somewhat different emphasis. Electronic systems are a vital, sometimes dominant, element in modern aircraft and spacecraft for navigation, guidance and control. In addition, electronic systems for remote sensing, communication, etc., normally comprise the entire payload of a spacecraft. Electronics and Systems engineering are key disciplines in such situations; dynamics and the thermosciences are important in designing the systems for the environment in which they must function.

Three streams are available in the Aerospace Engineering degree program (A) Aerodynamics, Propulsion and Vehicle Performance; (B) Aerospace Structures, Systems and Vehicle Design; (C) Aerospace Electronics and Systems. The (A) and (B) streams are identical to the Mechanical program for the first two years while the (C) stream differs only slightly in Second year. The Third year of all

these streams differs substantially from the Mechanical Engineering program while the Fourth year is almost entirely different. Stream (C) incorporates numerous electronics and systems engineering courses. All aerospace engineering students will participate as design team members in a single major project, typically involving the design of some aerospace vehicle in an environment much like that of an engineering design office.

Note:

Students were admitted to the First year of the program in 1988-89. The Second year was offered in 1989-90, the Third year is offered in 1990-91 and Fourth year will be offered in 1991-92.

Suggested Electives

Any course numbered Engineering 87/88/94/97.XXX for which the prerequisite material is satisfied. Aerospace Electronics and Systems students should note that to take most Engineering 87.4XX courses in their final year, Engineering 88.333★ is a prerequisite

Aerospace Second Year, Fall Term		Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.201	Intermediate Calculus	4	—	4.5
91.251★	Circuits and Signals	3	3	6
91.211★	Mechanics-Dynamics	3	3	6
88.230★	Introductory Fluid Mechanics	3	3	6
91.266★	Computer Methods in Engineering	3	1/2	4
Elective, Humanities or Social Sciences		3	—	4
91.200	Summer Report (Note a)	—	—	2
				(Previous Summer)
		19	9.5	32.5

Note:

(a) Engineering 91.200 is a course with a 0.0 credit value; it carries an Engineering weight of 2.

Aerospace Streams A, B Aerodynamics, Propulsion and Vehicle Performance Aerospace Structures, Systems and Vehicle Design Second Year, Winter Term		Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.201	Intermediate Calculus	4	—	4.5
82.220★	Mechanics of Materials I	3	3	6
91.241★	Introductory Thermodynamics and Heat Transfer	3	3	6
88.270★	Introduction to Engineering Materials	3	3	6
94.261★	Electrical Energy Conversion	3	3	6
Elective, Humanities or Social Sciences		3	—	4
		19	12	32.5

Aerospace Stream C Aerospace Electronics and Systems Second Year, Winter Term		Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.201	Intermediate Calculus	4	—	4.5
88.220★	Mechanics of Materials I	3	3	6
91.241★	Introductory Thermodynamics and Heat Transfer	3	3	6
94.260★	Systems and Simulation	3	3	6
94.261★	Energy Conversion	3	3	6
97.257★	Electronics I	3	3	6
		19	15	34.5

Aerospace Streams A, B Aerodynamics, Propulsion and Vehicle Performance Aerospace Structures, Systems and Vehicle Design Third Year, Fall Term		Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.375★	Mathematical Methods I	4	—	5
87.370★	Aerospace Materials and Manufacturing Methods	3	—	4
94.260★	Systems and Simulation	3	3	6
88.322★	Solid Mechanics I	3	3	6
88.333★	Fluid Mechanics	3	3	6
91.380★	Engineering Economics	3	—	4
		19	9	31

Aerospace Stream C Aerospace Electronics and Systems Third Year, Fall Term		Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.375★	Mathematics Methods 1	4	—	5
88.352★	Feedback Control Systems	3	—	4
91.380★	Engineering Economics	3	—	4
94.303★	Real Time Computing Systems	3	2	5
94.367★	Switching Circuits	3	3/2	5
97.359★	Electronics II	3	3	6
		19	6.5	29

Aerospace Streams A, B
Aerodynamics, Propulsion and Vehicle Performance
Aerospace Structures, Systems and Vehicle Design
Third Year, Winter Term

	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.352★ Probability and Statistics	4	—	5
87.302★ Aerospace Design and Practice	3	3	6
88.304★ Dynamics of Machinery	3	—	4
88.340★ Applied Thermodynamics	3	—	4
88.352★ Feedback Control Systems	3	—	4
88.390★ Mechanical and Aerospace Engineering Laboratory I	—	6	5
Elective, Humanities or Social Sciences	3	—	4
	19	9	32

Aerospace Stream C
Aerospace Electronics and Systems
Third Year, Winter Term

	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.352★ Probability and Statistics	4	—	5
88.304★ Dynamics of Machinery	3	—	4
94.351★ Communication Systems	3	3/2	5
94.361★ Microprocessor Systems	3	3/2	5
97.350★ Digital Electronic Circuit Design	2	3	5
97.354★ Electromagnetic Theory	3	3/2	5
	18	7.5	29

Aerospace Stream A
Aerodynamics, Propulsion and Vehicle Performance
Fourth Year, Fall Term

	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
87.497 Aerospace Engineering Project	—	8	4.5
87.403★ Aerospace Systems Design	3	3	6
87.432★ Applied Aerodynamics and Heat Transfer	3	—	4
87.436★ Aircraft and Spacecraft Performance and Dynamics	3	—	4
97.485★ Electronics, Instrumentation and Data Handling	3	—	4
88.491★ Mechanical and Aerospace Engineering Laboratory II	1	5	5
Engineering Elective	2	3/2	4
	15	17.5	31.5

Aerospace Stream B
Aerospace Structures, Systems and Vehicle Design
Fourth Year, Fall Term

	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
87.497 Aerospace Engineering Project	—	8	4.5
87.403★ Aerospace Systems Design	3	3	6
87.411★ Lightweight Structures	3	—	4
87.436★ Aircraft and Spacecraft Performance and Dynamics	3	—	4
97.485★ Electronics, Instrumentation and Data Handling	3	—	4
88.491★ Mechanical and Aerospace Engineering Laboratory II	1	5	5
Engineering Elective	2	3/2	4
	15	17.5	31.5

Aerospace Stream C Aerospace Electronics and Systems Fourth Year, Fall Term		Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
87.497	Engineering Project	—	8	4.5
87.403★	Aerospace Systems Design	3	3	6
Two of:				
94.445★	Discrete Time Systems	}		
94.460★	Data Communications			
97.453★	Radio Frequency Lines and Antennas			
	Elective, Engineering	3	3/2	5
	Elective, Humanities or Social Sciences	3	3/2	5
		2	3/2	4
		3	—	4
		14	15.5	28.5
Aerospace Stream A Aerodynamics, Propulsion and Vehicle Performance Fourth Year, Winter Term		Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
87.497	Aerospace Engineering Project	—	8	4.5
87.495★	Professional Practice Seminar	3	—	4
87.438★	Aircraft Stability and Control	3	—	4
	Engineering Elective	2	3/2	4
	Engineering Elective	2	3/2	4
	Engineering Elective	2	3/2	4
	Elective, Engineering or Scientific	2	3/2	4
		14	14	28.5
Aerospace Stream B Aerospace Structures, Systems and Vehicle Dynamics Fourth Year, Winter Term		Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
87.497	Aerospace Engineering Project	—	8	4.5
87.495★	Professional Practice Seminar	3	—	4
87.462★	Introductory Aeroelasticity	3	—	4
	Engineering Elective	2	3/2	4
	Engineering Elective	2	3/2	4
	Engineering Elective	2	3/2	4
	Elective, Engineering or Scientific	2	3/2	4
		14	14	28.5
Aerospace Stream C Aerospace Electronics and Systems Fourth Year, Winter Term		Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
87.497	Engineering Project	—	8	4.5
87.470★	Materials Engineering	3	3/2	5
87.495★	Professional Practice Seminar	3	—	4
Two of:				
97.460★	Radars and Navigation	}		
97.459★	Communication Links			
97.476★	Digital Integrated Electronics			
	Elective Engineering	3	3/2	5
	Elective Humanities and Social Sciences	3	—	4
		18	14	32.5

Civil Engineering Program

Civil engineers play a key role in the development and management of the infrastructure of a country. They are engaged in all aspects related to research, planning, construction and maintenance of bridges, buildings, dams, airports, power stations, highways, subways, transportation networks, harbours, water supply and waste water treatment facilities. The modern civil engineer is called upon to use his or her expertise in analysis, computer applications, design and management skills to plan and execute projects in areas such as energy resources development, engineering for cold climates, hazardous waste management and environmental engineering, which are of national importance.

At Carleton University, students in their final two and one-half years in the Civil Engineering program will build upon the broad background in engineering developed in the common core program of the first one and one-half years. The program of the Fourth year requires the students to study in the general areas of structural mechanics, structural engineering, geotechnical engineering and transportation engineering. The students are also encouraged to make use of all available elective courses to obtain as broad a background in Civil Engineering as possible.

Many civil engineers also make their careers in practices that are managerial in nature and involve managerial decision making. The managerial aspects of civil engineering and engineering at large is expected to play an increasing role in the future training of engineers. In recognizing this potential the Department of Civil Engineering has introduced the degree program in Civil Engineering with "Concentration in Management." In this program, the Civil Engineering curriculum is complemented by courses in subjects such as management accounting, industrial engineering, operations research and organizational behaviour. Upon satisfactory completion of a prescribed set of courses the students enrolled in the subspecialty will

receive the designation "Concentration in Management" on their transcripts.

For more information students should consult p. 282 and the booklet *A Guide to the Engineering Program*, available from the Registrar's Office.

Suggestive Electives

- 82.421★ Advanced Structural Analysis II
- 82.422★ Wood Engineering
- 82.426★ Structural Steel Design II
- 82.427★ Reinforced Concrete Design II
- 82.430★ Structural Planning in Architecture
- 82.431★ Foundation Engineering
- 82.437★ Hydraulics of Municipal Waste Water Systems
- 82.440★ Construction/Project Management
- 82.441★ Hydrology
- 82.450★ Computer Methods in Civil Engineering
- 88.270★ An Introduction to Engineering Materials
- 88.411★ Strength Analysis
- 88.412★ Failure Analysis and Fracture Control
- 88.414★ Vibrations in Mechanical Systems
- 88.430★ Acoustics and Noise Control
- 88.443★ Energy Conversion and Power Generation
- 88.447★ Heating, Ventilating and Air Conditioning
- 88.468★ Engineering Materials
- 88.474★ Computer Integrated Manufacturing Systems (CIMS)
- 94.260★ Systems and Simulation
- 94.261★ Electrical Energy Conversion
- 94.304★ File Structures and Data Bases
- 94.415★ Engineering Management

Civil Second Year, Fall Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.201 Intermediate Calculus	4	—	4.5
91.251★ Circuits and Signals	3	3	6
91.211★ Mechanics-Dynamics	3	3	6
91.241★ Introductory Thermodynamics and Heat Transfer	3	3	6
91.266★ Computer Methods in Engineering	3	1/2	4
Elective Humanities or Social Sciences	3	—	4
91.200 Summer Report (Note a)	—	—	2
			(Previous Summer)
	19	9.5	32.5

Note:

(a) Engineering 91.200 is a course with a 0.0 credit value; it carries an Engineering weight of 2.

Civil Second Year, Winter Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.201 Intermediate Calculus	4	—	4.5
82.220★ Mechanics of Materials I	3	3	6
88.230★ Introductory Fluid Mechanics	3	3	6
Two of:			
88.270★ An Introduction to Engineering Materials	3		6
94.261★ Electrical Energy Conversion		3	
94.260★ Systems and Simulation		3	
Elective Humanities or Social Sciences	3	—	4
	19	12	32.5

Civil Third Year, Fall Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.375★ Mathematical Methods I	4	—	5
82.322★ Mechanics of Materials II	3	3	6
82.324★ Introduction to Structural Design	2	3/2	4
82.328★ Geotechnical Mechanics	3	3/2	5
82.337★ Municipal Engineering	3	3/2	5
91.380★ Engineering Economics	3	—	4
	18	7.5	29

Civil Third Year, Winter Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.352★ Probability and Statistics	4	—	5
82.104★ Surveying (Note b)			4(Spring)
82.323★ Structural Analysis I	3	3/2	5
82.325★ Design of Structural Steel Components	3	3/2	5
82.326★ Design of Reinforced Concrete Components	3	3/2	5
82.334★ Transportation Engineering and Planning	2	3/2	4
Elective, Engineering or Scientific	2	3/2	4
Elective, Humanities or Social Sciences	3	—	4
	20	7.5	32 +4(Spring)

Note:

(b) Students are encouraged to take Engineering 82.104★ (Surveying) in either the First or Second year of their Engineering program. Lectures and field work three weeks at the end of the Winter term.

Civil Fourth Year, Fall Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
82.497 Fourth-Year Project	—	8	4.5
82.420★ Structural Analysis II	3	3/2	5
82.428★ Geotechnical Engineering	3	3/2	5
82.432★ Reinforced Concrete Design I	3	3/2	5
82.438★ Structural Steel Design I	3	3/2	5
One of:			
82.422★ Wood Engineering	2	3/2	4
82.440★ Construction/Project Management			
82.441★ Hydrology			
82.450★ Computer Methods in Civil Engineering			
Free Elective (Note c)	3	—	4
	17	15.5	32.5

Note:

(c) This course carries a typical elective course weight; actual weight used is the assigned weight of the course selected by each student.

Civil Fourth Year, Winter Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
82.497 Fourth-Year Project	—	8	4.5
82.429★ Highway Engineering	2	3/2	4
82.495★ Professional Practice Seminar	3	—	4
Three of:			
82.421★ Advanced Structural Analysis	2	3/2	4
82.427★ Reinforced Concrete Design II			
82.430★ Structural Planning in Architecture			
82.431★ Foundation Engineering			
82.433★ Urban Planning	2	3/2	4
82.435★ Transportation Geography	2	3/2	4
82.437★ Hydraulics of Municipal Waste Water Systems			
82.439★ Structural Steel Design II			
Free Elective (Note c)	3	—	4
	14	14	28.5

Note:

(c) This course carries a typical elective course weight; actual weight used is the assigned weight of the course selected by each student.

Computer Systems Engineering Program

Computer Systems Engineering is concerned with the design and implementation of integrated computer systems to solve practical problems in areas such as communications, process control, robotics and information storage, transfer and display. Examples include computer network design, remote distributed control of pipeline pumping stations, robot control systems, telephone switching systems, and videotex data storage/transmissions/display systems.

Students in the final two and one-half years in the Computer Systems Engineering program at Carleton University build upon the broad background in engineering developed in the common core programs of the first one and one-half years. While the Third and Fourth years have some commonality with the Electrical Engineering program, Computer Systems engineers concentrate primarily on digital logic, computer systems organization and design, software and systems engineering. In addition, students may take a number of electives either to broaden their background or to provide further specialized knowledge. Suggested Electives

Engineering

- 82.220★ Mechanics of Materials I
- 88.230★ Introductory Fluid Mechanics
- 88.271★ Elements of Materials Engineering
- 88.453★ An Introduction to Robotics
- 94.310★ Systems Analysis
- 94.320★ Industrial Engineering
- 94.405★ Discrete Simulation and Its Applications
- 94.415★ Engineering Management
- 94.445★ Discrete Time Systems
- 94.462★ Introduction to Computer Communications
- 94.481★ Software Engineering Project
- 97.354★ Electromagnetic Theory
- 97.368★ Solid State Electronics
- 97.452★ Microwave Circuits
- 97.453★ Radio Frequency Lines and Antennas
- 97.459★ Communications Links
- 97.469★ Integrated Circuit Design and Fabrication
- 97.475★ Electronic Properties of Materials
- 97.477★ Analog Integrated Electronics

Mathematics, Physics and Computer Science

- 69.384★ Data Structures and Algorithm Analysis
 70.483★ Computable Functions
 70.484★ Design and Analysis of Algorithms
 75.364★ Modern Physics
 95.207★ Programming Language Concepts
 95.407★ Applied Artificial Intelligence

Business, Economics and Law

- 42.101★ Principles of Financial Accounting
 42.102★ Management Accounting
 42.200 Intermediate Accounting
 42.250★ Introduction to Business Finance
 42.261★ Business Law I

42.262★ Business Law II

- 42.311★ Micro-Organizational Behaviour
 43.100 Introduction to Economics
 43.201★ Introduction to Microeconomic Theory and Analysis
 43.356★ Introduction to Labour Economics
 43.357★ Introduction to Industrial Relations
 43.430 Industrial Organization and Public Policy
 51.321★ Legal Organization of Economics Units
 51.333★ Injury, Compensation and the Law
 51.352★ Communications Law II
 51.422★ Regulation of Management of Economic Units

Computer Systems	Lectures and	Laboratory and	Course
Second Year, Fall Term	Tutorials	Problem Analysis	Weight
69.201 Intermediate Calculus	4	—	4.5
91.251★ Circuits and Signals	3	3	6
91.211★ Mechanics-Dynamics	3	3	6
91.241★ Introductory Thermodynamics and Heat Transfer	3	3	6
91.266★ Computer Methods in Engineering	3	1/2	4
Elective, Humanities or Social Sciences	3	—	4
91.200 Summer Report (Note a)	—	—	2
(Previous Summer)			
	19	9.5	32.5

Note:

(a) Engineering 91.200 is a course with a 0.0 credit value; it carries an Engineering weight of 2.

Computer Systems	Lectures and	Laboratory and	Course
Second Year, Winter Term	Tutorials	Problem Analysis	Weight
69.201 Intermediate Calculus	4	—	4.5
97.257★ Electronics I	3	3	6
94.260★ Systems and Simulation	3	3	6
94.202★ Advanced Programming Techniques	3	2	5
94.303★ Real Time Computing Systems	3	2	5
Elective, Humanities or Social Sciences	3	—	4
	19	10	30.5

Computer Systems	Lectures and	Laboratory and	Course
Third Year, Fall Term	Tutorials	Problem Analysis	Weight
69.375★ Mathematical Methods I	4	—	5
91.380★ Engineering Economics	3	—	4
94.301★ Operating Systems	3	—	4
94.304★ File Structures and Data Bases	3	—	4
94.367★ Switching Circuits	3	3/2	5
97.359★ Electronics II	3	3	6
	19	4.5	28

Computer Systems Third Year, Winter Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.352★ Probability and Statistics	4	—	5
94.351★ Communication Systems	3	3/2	5
94.361★ Microprocessor Systems	3	3/2	5
94.333★ Advanced Real Time Programming	2	3	5
97.350★ Digital Electronic Circuit Design	2	3	5
Elective, Humanities or Social Sciences	3	—	4
	17	9	29

Computer Systems Fourth Year, Fall Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
94/97.498 Engineering Project (Note b)	—	8	4.5
94.457★ Introduction to the Architecture of Computer Systems	3	—	4
94.460★ Data Communications	3	3/2	5
94.480★ Software Engineering	3	3/2	5
Elective, Engineering or Scientific	2	3/2	4
Elective, Humanities or Social Sciences	3	—	4
	14	12.5	26.5

Note:

(b) See course descriptions to determine appropriate course number.

Computer Systems Fourth Year, Winter Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
94/97.498 Engineering Project (Note b)	—	8	4.5
94.485★ Computer Systems Design Laboratory	2	4	5
94.495★ Professional Practice Seminar	3	—	4
97.476★ Digital Integrated Electronics	2	3	4
Elective, Engineering or Scientific	2	3/2	4
Elective, Engineering or Scientific	2	3/2	4
	11	18	25.5

Note:

(b) See course description to determine appropriate course number.

Electrical Engineering Program

Electrical engineers are engaged in research, design and development associated with a wide variety of electrical apparatus and systems. Examples include electronics, circuit design and fabrication, communications, power systems, and the design and application of computers. Opportunities exist for electrical engineers in industry, government and education, as well as in private consulting.

At Carleton University, the first one and one-half years of the Engineering program provide a broad common background of technical fundamentals. The last two and one-half years of Electrical Engineering concentrate primarily on electronics, electromagnetics, control and communications. In addition, Electrical Engineering students may further enhance their specialized knowledge by choosing Fourth-

year Engineering electives in the areas of electronics, materials, systems and computing.

Management and business decision-making are often important in engineering professional practice. Moreover, it is expected that managerial matters will play an ever increasing role. Students in Electrical Engineering who wish to acquire a background in this area are invited to select the Concentration in Management beginning at Second year. Those who successfully complete this concentration will receive an entry "Concentration in Management" on their transcripts. For more information students should consult p. 282 and the booklet *A Guide to the Engineering Program* available from the Registrar's Office.

Suggested Electives

88.430★ Acoustics and Noise Control	94.460★ Data Communications
88.443★ Energy Conversion and Power Generation	94.481★ Software Engineering Project
88.453★ An Introduction to Robotics	94.485★ Computer Systems Design Laboratory
88.474★ Computer Integrated Manufacturing Systems (CIMS)	97.452★ Microwave Circuits
88.475★ CAD/CAM	97.455★ Telecommunication Circuits
94.304★ File Structures and Data Bases	97.456★ CAD for Communication Circuits
94.310★ Systems Analysis	97.460★ Radar and Navigation
94.320★ Industrial Engineering	97.470★ Integrated Circuit Technology II
94.362★ Electric Power Circuits and Machines	97.475★ Electronic Properties of Materials
94.401★ Operating Systems	97.476★ Digital Integrated Electronics
94.405★ Discrete Simulation and its Applications	97.478★ Advanced Digital IC Design
94.415★ Engineering Management	97.496★ Special Topics in Electrical Engineering
94.445★ Discrete Time Systems	
94.457★ Introduction to the Architecture of Computer Systems	

For Computer Science electives see p. 272

Electrical Second Year, Fall Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.201 Intermediate Calculus	4	—	4.5
91.251★ Circuits and Signals	3	3	6
91.211★ Mechanics-Dynamics	3	3	6
91.241★ Introductory Thermodynamics and Heat Transfer	3	3	6
91.266★ Computer Methods in Engineering	3	1/2	4
Elective, Humanities or Social Sciences	3	—	4
91.200 Summer Report (Note a)	—	—	2
			(Previous Summer)
			32.5

Note:

(a) Engineering 91.200 is a course with a 0.0 credit value; it carries an Engineering weight of 2.

Electrical Second Year, Winter Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.201 Intermediate Calculus	4	—	4.5
97.257★ Electronics I	3	3	6
94.260★ Systems and Simulation	3	3	6
88.271★ Introduction to Electrical Materials	3	3/2	6
94.261★ Electrical Energy Conversion	3	3	6
Elective, Humanities or Social Sciences	3	—	4
			32.5

Electrical Third Year, Fall Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.375★ Mathematical Methods I	4	—	5
91.380★ Engineering Economics	3	—	4
94.303★ Real-Time Computing Systems	3	2	5
94.367★ Switching Circuits	3	3/2	5
97.359★ Electronics II	3	3	6
97.368★ Solid State Electronics	3	3/2	5
			30

Electrical Third Year, Winter Term	Lectures and Tutorials	Laboratory and Prob- lem Analysis	Course Weight
69.352★ Probability and Statistics	4	—	5
94.202★ Advanced Programming Techniques	3	2	5
94.351★ Communication Systems	3	3/2	5
97.350★ Digital Electronic Circuit Design	3	3	5
97.354★ Electromagnetic Theory	3	3/2	5
Elective Humanities or Social Sciences	3	—	4
	19	8.0	29

Electrical (General Stream) Fourth Year, Fall Term	Lectures and Tutorials	Laboratory and Prob- lem Analysis	Course Weight
94/97.497 Engineering Project (Note b)	—	8	4.5
Four of:			
94.455★ Automatic Control Systems I	3	—	4
94.457★ Introduction to the Architecture of Computer Systems			
94.460★ Data Communications			
94.461★ Microprocessors Systems			
97.453★ Radio Frequency Lines and Antennas			
97.469★ Integrated Circuit Design and Fabrication	3	3/2	5
97.477★ Analog Integrated Electronics	3	3/2	5
Elective, Humanities or Social Sciences	3	—	4
	15	12.5	27.5

Note:

(b) See course description to determine appropriate course number.

Electrical (Electronics Stream) Fourth Year, Fall Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
94/97.497 Engineering Project (Note b)	—	8	4.5
94.461★ Microprocessor Systems	3	3/2	5
97.453★ Radio Frequency Lines and Antennas	3	3/2	5
97.469★ Integrated Circuit Design and Fabrication	3	3/2	5
97.477★ Analog Integrated Electronics	3	3/2	5
Elective, Humanities or Social Sciences	3	—	4
	15	14	28.5

Note:

(b) see course description to determine appropriate course number.

Electrical (Systems Stream) Fourth Year, Fall Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
94/97.497 Engineering Project (Note b)	—	8	4.5
94.455★ Automatic Control Systems I	3	3/2	5
94.457★ Introduction to the Architecture of Computer Systems	3	—	4
94.460★ Data Communications	3	3/2	5
94.461★ Microprocessor Systems	3	3/2	5
Elective, Humanities or Social Sciences	3	—	4
	15	12.5	27.5

Note:

(b) see course description to determine appropriate course number

Electrical (Telecommunications) Fourth Year, Fall Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
94/97.497 Engineering Project (Note b)	—	8	4.5
94.455★ Automatic Control Systems I	3	3/2	5
94.460★ Data Communications	3	3/2	5
94.461★ Microprocessor Systems	3	3/2	5
97.453★ Radio Frequency Lines and Antennas	3	3/2	5
Elective, Humanities or Social Sciences	3	—	4
	15	14	28.5

Note:

(b) see course description to determine appropriate course number.

Electrical (General Stream) Fourth Year, Winter Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
94/97.497 Engineering Project (Note b)	—	8	4.5
97.495★ Professional Practice Seminar	3	—	4
Elective, Engineering	3	3/2	5
Elective, Engineering	3	3/2	5
Elective, Engineering or Scientific	3	3/2	5
Elective, Engineering or Scientific	3	3/2	5
	15	14	28.5

Note:

(b) see course description to determine appropriate course number.

Electrical (Electronics Stream) Fourth Year, Winter Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
94/97.497 Engineering Project (Note b)	—	8	4.5
97.495★ Professional Practice Seminar	3	—	4
97.470★ Integrated Circuit Technology II	3	3/2	5
97.476★ Digital Integrated Electronics	3	3/2	5
Elective, Engineering or Scientific	3	3/2	5
Elective, Engineering or Scientific	3	3/2	5
	15	14	28.5

Note:

(b) see course description to determine appropriate course number.

Electrical (Systems Stream) Fourth Year, Winter Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
94/97.498 Engineering Project (Note b)	—	8	4.5
94.401★ Operating Systems	3	—	4
97.495★ Professional Practice Seminar	3	—	4
Elective, Engineering	2	3/2	4
Elective, Engineering or Scientific	2	3/2	4
Elective, Engineering or Scientific	2	3/2	4
	12	12.5	24.5

Note:

(b) see course description to determine appropriate course number.

Electrical (Telecommunication Stream) Fourth Year, Winter Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
94/97.497 Engineering Project (Note b)	—	8	4.5
97.495★ Professional Practice Seminar	3	—	4
94.470★ Telecommunications Engineering	3	3/2	5
Two of:			
97.452★ Microwave Circuits	3	3/2	5
97.455★ Telecommunication Circuits	3	3/2	5
97.459★ Communication Links			
Elective, Engineering or Scientific	3	3/2	5
	15	14	28.5

Mechanical Engineering Program

Mechanical Engineering by its nature is a highly diversified discipline, encompassing a range of activities from manufacturing processes and design to energy conversion and conservation. The main topic areas of the discipline are solid mechanics and materials, fluid mechanics and thermo-sciences which together provide the breadth necessary for the graduate mechanical engineer.

At Carleton University, students in their final two and one-half years in the Mechanical Engineering program will build upon the broad background in engineering developed in the common core program of the first one and one-half years. In addition to the continued major emphasis on design, dynamics, thermodynamics and heat transfer, the student can choose elective courses that span a wide range of applied subjects like noise control, energy conversion and power generation, vehicle technology, aerodynamics and flight mechanics, automatic controls, etc., which reflect the wide range of interests of faculty members of the Department of Mechanical and Aerospace Engineering. In addition, the final-year student completes a major project on a topic of current interest in mechanical or aeronautical engineering.

In select cases, students of high academic standing may be able to coordinate Engineering 88.497 project work with Masters thesis work such that they can complete an M.Eng. program about one year after obtaining their B.Eng. degree. Interested students should consult the Departmental Chairman or Supervisor of Graduate Studies near the end of their Third year.

Management and business decision-making are often im-

portant in engineering professional practice. Moreover, it is expected that managerial matters will play an ever increasing role. Students in Mechanical Engineering who wish to acquire a background in this area are invited to select the Concentration in Management beginning at Second year. Those who successfully complete this concentration will receive an entry "Concentration in Management" on their transcripts. For more information students should consult p. 282 and the booklet *A Guide to the Engineering Program* available from the Registrar's Office.

Mechanical Engineering with Concentration in Computer-Integrated Manufacturing

A special concentration in Computer-Integrated Manufacturing (CIM) is available for students with an interest in this area. The concentration is designed to provide an understanding of the issues, concepts and techniques of applying computer technology to design and manufacturing. The concentration consists of the following courses: Year Two: Business 42.101★, Financial Accounting, and Business 42.102★, Management Accounting; Year Three: Engineering 88.370★, Manufacturing Engineering, 91.380★, Engineering Economics, and Business 42.210★, Management and Organizational Behaviour; Year Four: Engineering 88.475★, CAD/CAM, Engineering 88.474★, Computer Integrated Manufacturing Systems, Engineering 88.453★, Robotics, Engineering 94.405★, Discrete Simulation, Engineering 94.310★, Systems Analysis and 94.320★ Industrial Engineering.

The brochure "A Guide to the Engineering Program," available from the Registrar's Office should be consulted for the appropriate selection of elective choices for this program. A student who wishes to follow the CIM concentration should declare his/her intentions at the beginning of the Second year. Those who successfully complete this option will receive an entry "Concentration in Computer Integrated Manufacturing" on their transcripts.

Suggested Electives

- 82.104★ Surveying
- 82.334★ Transportation Engineering and Planning
- 82.437★ Hydraulics of Municipal Waste Water Systems
- 88.406★ Vehicle Engineering I
- 88.407★ Vehicle Engineering II
- 88.411★ Strength Analysis
- 88.412★ Failure Analysis and Fracture Control

- 88.414★ Vibrations in Mechanical Systems
- 88.430★ Acoustics and Noise Control
- 88.432★ Fundamentals of Fluid Dynamics
- 88.435★ Fluid Machinery
- 88.437★ Mechanics of Flight
- 88.441★ Power Plant Analysis
- 88.443★ Energy Conversion and Power Generation
- 88.447★ Heating, Ventilating and Air Conditioning
- 88.453★ An Introduction to Robotics
- 88.464★ Finite Element Methods in Mechanical Engineering
- 88.468★ Advanced Engineering Materials
- 88.474★ Computer Integrated Manufacturing Systems (CIMS)
- 88.475★ CAD/CAM
- 94.362★ Electric Power Circuits and Machines
- 94.415★ Engineering Management

Mechanical Second Year, Fall Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.201 Intermediate Calculus	4	—	4.5
91.251★ Circuits and Signals	3	3	6
91.211★ Mechanics-Dynamics	3	3	6
88.230★ Introductory Fluid Mechanics	3	3	6
91.266★ Computer Methods in Engineering	3	1/2	4
Elective, Humanities or Social Sciences	3	—	4
91.200 Summer Report (Note a)	—	—	2
			(Previous Summer)
			19 9.5 32.5

Note:

(a) Engineering 91.200 is a course with a 0.0 credit value; it carries an Engineering weight of 2.

Mechanical Second Year, Winter Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.201 Intermediate Calculus	4	—	4.5
82.220★ Mechanics of Materials I	3	3	6
91.241★ Introductory Thermodynamics and Heat Transfer	3	3	6
88.270★ Introduction to Engineering Materials	3	3	6
94.261★ Electrical Energy Conversion	3	3	6
Elective, Humanities or Social Sciences	3	—	4
			19 12 32.5

Mechanical Third Year, Fall Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.375★ Mathematics	4	—	5
88.322★ Solid Mechanics	3	3	6
88.333★ Fluid Mechanics and Heat Transfer	3	3	6
88.370★ Principles of Manufacturing Engineering	3	—	4
91.380★ Engineering Economics	3	—	4
94.260★ Systems and Simulation	3	3	6
			19 9 31

Mechanical Third Year, Winter Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
69.352★ Probability and Statistics	4	—	5
88.302★ Machine Design and Practice	3	3	6
88.304★ Dynamics of Machinery	3	—	4
88.340★ Applied Thermodynamics	3	—	4
88.390★ Mechanical Engineering Laboratory I	—	6	5
88.352★ Feedback Control Systems	3	—	4
Elective, Humanities or Social Sciences	4	—	4
	20	9	32
Mechanical Fourth Year, Fall Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
88.497 Engineering Project	—	8	4.5
88.403★ Mechanical Systems Design	3	3	6
88.446★ Heat Transfer	3	—	4
88.491★ Mechanical Engineering Laboratory II	1	5	5
97.485★ Instrumentation, Measurement and Data Handling	3	—	4
Elective, Engineering	2	3/2	4
Elective, Engineering or Scientific	2	3/2	4
	14	19	31.5
Mechanical Fourth Year, Winter Term	Lectures and Tutorials	Laboratory and Problem Analysis	Course Weight
88.497 Engineering Project	—	8	4.5
88.495★ Professional Practice Seminar	3	—	4
Elective, Engineering	2	3/2	4
Elective, Engineering	2	3/2	4
Elective, Engineering	2	3/2	4
Elective, Engineering	2	3/2	4
Elective, Engineering or Scientific	2	3/2	4
	13	15.5	28.5
Qualifying-University Year			

Students who have not yet completed six Ontario Academic Credits (including Calculus, Algebra and Geometry, Physics and Chemistry) or equivalent may apply to Qualifying-University year. The formal admission requirements are listed on pp. 25 and 33, although alternative background preparations (e.g. courses from other Provinces, mature applicant status, etc.) may be presented for evaluation.

The course of studies consists of five full credits including mathematics, physics, chemistry and electives. The exact course of studies depends on background preparation and is to be determined in consultation with the Engineering Registrar's Office at the time of registration.

Accelerated Program

Qualifying-University-year (Engineering) students who pass all required courses in Qualifying-University year, including electives, with a B- or 7.0 average, may have their programs assessed for the purpose of reducing the number of courses required to graduate from the Bachelor of Engineering program. For example, approved humanities/social sciences electives taken as Qualifying-University-year electives, which are at a First-year level or higher, may be used to fulfil program requirements in the Bachelor of

Engineering program. It is necessary for Qualifying-University-year students to meet the promotion requirements of the Qualifying-University year, as well as the Accelerated Progress requirements, in order to be considered for Accelerated Progress.

Academic Standing and Promotion

Students in Qualifying-University year are permitted to write supplemental examinations or to enrol in Summer-session courses, in a maximum of two credits or equivalent.

To achieve satisfactory academic standing the student must, at the end of August:

- have received credit in Chemistry, Mathematics and Physics
- have a grade-point average of 3.4 in all courses completed in the year.

Students who achieve satisfactory academic standing are promoted to First-year Engineering. Students who fail to achieve satisfactory academic standing forfeit their undergraduate status in the Faculty of Engineering.

The Qualifying-University year is not considered as part of the Bachelor of Engineering program for the purpose of assessment of academic standing in the program.

General Information

The study of Engineering is necessarily structured. Upper-year courses are built on the material studied in previous years. The program consists of a consecutive sequence of four years, each of which comprises the two terms of the Fall/Winter session. Regulations governing promotion are detailed below.

With few exceptions, courses in the Faculty of Engineering are offered only in the Fall/Winter session and only in the Day division. However, a significant portion of the Engineering program involves courses in the Faculties of Science, Arts and Social Sciences; many of these courses are offered in the Summer session and in the Evening division of the Fall/Winter session.

It should be noted that in all courses with computer programming assignments students usually find it necessary to be on campus at other than scheduled periods to make use of computing facilities.

When a student first registers in the Faculty of Engineering, he or she is assigned a faculty adviser who provides counselling of an academic nature and advises on any problems the student may have. Students are encouraged to consult with their faculty advisers on matters in these areas. For administrative matters regarding regulations and records, students are encouraged to seek advice from the Divisional Registrar's Office.

Course Load

The course requirements for each year of the program are tabulated on pp. 281-296 along with the course weight and hours for each course. Where the fraction $3/2$ appears in the laboratory and problem analysis column, it means a three-hour period is scheduled on alternate weeks; the fraction $1/2$ refers to a one hour workshop on alternate weeks.

During the Fall/Winter session, the normal course load for a full-time student is all of the courses for the program year in which the student is registered. The normal course load for Fourth-year students is the lesser of the courses of the program year or the number of courses required to satisfy graduation requirements. In order to enrol in a course, a student must have satisfied the prerequisites for that course or have permission of the department offering the course. Any student who is enrolled in a course but who has not satisfied the prerequisites for that course is required to obtain approval or may be required to withdraw from the course.

Except for those Fourth-year students with fewer than five credits outstanding in their program, full-time students must, after the last date for withdrawal from courses in each term, remain enrolled in a minimum of five credits, part-time students in a maximum of two credits. In exceptional circumstances, and on the recommendation of a departmental chairman or the Registrar, the Dean of Engineering may waive this regulation where it is deemed to be in the best interest of the student and of the Faculty of Engineering.

Students with a cumulative weighted grade-point average of at least 5.0 may enrol in a maximum of one credit in addition to those of the program year in which they are registered.

Students may enrol in non-elective courses from a higher program year than the one in which they are registered if:

- (a) they have C- or better in the stated prerequisites for such courses; and
- (b) they are concurrently enrolled in all outstanding non-

elective courses from the program years preceding the one in which they are registered; and

(c) they have the permission of the department that offers the course.

During the Summer session, the maximum course load is two credits.

Elective Courses

The program course requirements tabulated on pp. 281-296 include humanities or social sciences electives. Electives are selected from one or more of the categories listed below. A free elective can be chosen from any of the three categories. Where an elective course is shown in the tables with lectures two hours a week and laboratory/problem analysis three hours alternate weeks, the requirement is equally satisfied by a course having three hours lectures a week and no laboratory/problem analysis.

1. *Engineering Electives*: All undergraduate courses bearing the departmental numbers of the Faculty of Engineering (i.e. 82, 87, 88, 90, 94, 97) are approved Engineering electives. Graduate courses bearing those numbers may be taken as electives with the approval of the chairman of the department offering the course.

2. *Scientific Electives*: Courses in this classification include the physical sciences, mathematical sciences, computer science and related courses. Approved scientific electives are listed in the booklet, *A Guide to the Engineering Program*, available from the Divisional Registrar's Office.

3. *Humanities or Social Sciences Electives*: Courses in this classification must be chosen from among those listed as approved in the booklet, *A Guide to the Engineering Program*, available from the Divisional Registrar's Office.

Student Responsibility

The student is responsible for knowing the regulations of the Faculty of Engineering and for complying with them. Any exceptions to the regulations must be approved, in writing, by the Faculty of Engineering Committee on Admission and Studies.

It is also each student's responsibility to establish contact with his or her faculty adviser.

Grading System

Standing in courses will be determined by the Faculty and will be shown by alphabetical grades. The grades used, with their corresponding grade points are as follows:

A+	12	B+	9
A	11	B	8
A-	10	B-	7
C+	6	D+	3
C	5	D	2
C-	4	D-	1

Passed Supplemental Examination: D-

Each course is assigned a course weight, shown on the charts on pp. 281-296. The weighted grade points achieved in a course are the product of the course weight and the grade points for that course. The cumulative weighted

grade-point average is the sum of weighted grade points divided by the sum of course weights, for all courses for which the student has received a grade in the program of studies.

Where regulations refer to one credit, it is understood that two half-course credits are in all respects equivalent to one credit. Any course in the Engineering program with a weight of seven or greater is one credit; any course with a weight of six or less is a half-course credit. The only exception is the Engineering Summer Report which has a 0.0 credit value; it carries an Engineering weight of 2.

Notations to represent special circumstances are as follows:

Aeg

Aegrotat standing is a pass standing granted despite absence from the final examinations. It may be granted by the Engineering Faculty Committee on Admission and Studies only in response to a student's written request. Aegrotat standing will be granted only in exceptional circumstances and if the term work has been of high quality.

F

Failure; no academic credit.

FNS

Failure, but with supplemental privileges withdrawn because of unsatisfactory term work or an unacceptably low mark in the examination. No academic credit.

Wdn

Withdrawn in good standing; no academic credit.

Abs

Absent from formally scheduled final, special final and supplemental examinations where the necessary term work has been completed. No supplemental privileges. No academic credit.

Def

Students who are absent from final examinations or who are unable to complete their course work for medical or compassionate reasons may apply to the Engineering Faculty Committee on Admission and Studies for deferred examination privileges. Such applications must:

1. be made in writing to the Divisional Registrar's Office not later than one week after the date of the examination; and
2. be fully supported in the case of illness by a medical certificate or appropriate documents in other cases.

Grade-Raising Examinations

The Faculty of Engineering does not recognize grade-raising examinations. Students enrolled in the Bachelor of Engineering degree program may not take grade-raising examinations in any course that forms part of their program.

Academic Standing, Promotion and Continuation

Supplemental Examination Privileges

Students who are granted supplemental examination privileges are permitted to write supplemental examinations in any courses from the Fall/Winter session just completed for which they have received a grade of *F*. Such

students may register in Summer session in addition to applying to write one or more supplemental examinations in August.

Supplemental examinations for courses in the Faculty of Engineering are scheduled during the August supplemental period. For certain Fall-term half-credit courses in the Faculties of Science, Arts, and Social Sciences, supplemental examinations are scheduled only in the February examination period.

The requirements for supplemental examination privileges are based on final grades only, for all courses taken in the Fall/Winter session just completed. The following are the minimum requirements for full-time students:

In First year, not repeating the year:

three credits passed and 135 weighted grade points.

In Second, Third and Fourth years, not repeating the year:

four credits passed and 150 weighted grade points.

Repeating any year:

four credits passed and 200 weighted grade points.

For part-time students, eligibility for supplemental examinations will be assessed at the end of each group of three credits and based upon the final grades achieved in those courses. Number of passed courses and weighted grade points required are pro-rated to one-half of those listed above.

Students who fail to meet the minimum requirements for the granting of supplemental examination privileges are also ineligible to register in Summer session and forfeit their undergraduate status in the Faculty of Engineering.

Summer Session

Students are permitted to enrol in a maximum of two credits in the Summer session. Courses taken by Engineering students in the Summer session may be used to complete program-year requirements for the previous Fall/Winter session; such courses count towards both year promotion and program-year completion, and are reflected in the year's course count, the year's weighted grade-point average, and in the cumulative weighted grade-point average.

Summer session courses that are not part of program-year requirements for the previous Fall/Winter-session count neither towards promotion from nor completion of that year's program, nor are they reflected in that year's course count. While such courses taken during a Summer session may be used to fulfil future program requirements, these courses will not affect the promotion decision for either the current year or for any future year. Such courses will count only towards degree program completion, and will be reflected only in the cumulative weighted grade-point average.

Academic Standing

Academic standing for the academic year is determined, for full-time students, at the beginning of September. Standing is based on grades achieved during the previous 12-month period. This includes all passing grades for the Fall/Winter session, supplemental examination results in Fall/Winter session courses, and final grades in Summer session courses which are relevant to the previous Fall/Winter session.

The following are the minimum requirements for satisfactory academic standing for full-time students:

In First year, not repeating the year:

four credits passed and 180 weighted grade points.

In Second, Third and Fourth years, not repeating the year: four credits passed and 200 weighted grade points.

Repeating any year: five credits passed and 250 weighted grade points.

For part-time students, academic standing is determined at the completion of each group of three credits, using the appropriate criterion above. Number of passed courses and weighted grade points required are pro-rated to one-half of those listed above.

Discredits

A discredit is a failing grade (*F, FNS, Abs*) in a full course (1.0 credit) or the equivalent.

Students who accumulate more than three full-course discredits or the equivalent forfeit their undergraduate status in the Faculty of Engineering.

A discredit is defined as a failing grade (*F, FNS, ABS*) earned while a student is registered in the Engineering program in Second year, Third year, Fourth year, or repeating any year. For example, a failed full-course followed by a failed supplemental examination counts as two full-course discredits.

Promotion

Students who achieve satisfactory academic standing are promoted to the next year of the program, except that:

1. for promotion to Third year, credit is required for all non-elective courses of First year; and
2. for promotion to Fourth year, credit is required for all non-elective courses of Second year.

Students who fail to achieve satisfactory academic standing are placed on academic probation and may repeat the year just completed; the following conditions apply:

1. Mandatory courses in which at least *B-*, and optional courses in which at least *C-*, grades were achieved in the failed year, need not be repeated;
2. In a repeated year, the course load is either five or six credits and must be approved by the Dean of Engineering or the Registrar.

Exceptions:

1. Students failing in a repeated year forfeit their undergraduate status;
2. Students who have previously been on academic probation forfeit their undergraduate status;
3. Students who accumulate more than 3.0 discredits in their program, exclusive of their First year, forfeit their undergraduate status.

Graduation

In order to fulfil the minimum graduation requirements for the degree of Bachelor of Engineering, a candidate must:

1. have completed the requirements of the First to Fourth years, inclusive.
2. have a cumulative weighted grade-point average of at least 3.4.
3. have achieved satisfactory academic standing in the final year of study.
4. have a weighted grade-point average of 3.4 on the requirements of the Fourth year program.

5. be recommended for graduation by the Faculty of Engineering.

Students must also fulfil all University graduation requirements (see pp. 38-39).

Degrees with Distinction

For students who entered the Engineering program after July 1, 1984, two classes of degrees may be awarded to students with exceptional academic standing.

Upon recommendation of the Faculty of Engineering, the notation "with High Distinction" may be made on the academic record of a candidate for the degree of Bachelor of Engineering. To be considered for recommendation, the candidate is expected to obtain a weighted grade-point average of at least 10.0 in the course requirements of the Fourth year of that student's Program Option; in addition, the student must present a weighted grade-point average of at least 8.0 in the course requirements of the First to Fourth years, inclusive. Any candidate with a failure, supplemental examination, repetition or replacement course will not normally be considered for a degree "with High Distinction."

Upon recommendation of the Faculty of Engineering, the notation "with Distinction" may be made on the academic record of a candidate for the degree of Bachelor of Engineering. To be considered for this recommendation, the candidate is expected to obtain a weighted grade-point average of at least 9.0 in the course requirements of the Fourth year of that student's Program Option; in addition, the student must present a weighted grade-point average of at least 7.0 in the course requirements of the First to Fourth years, inclusive. Any candidate with a failure, supplemental examination, repetition or replacement course in more than a total of two credits will not normally be considered for a degree "with Distinction."

Note:

In addition to these numerical requirements, students must also fulfil the detailed requirements listed under the "Graduation" section, see above.

Graduate Programs

Programs of study are offered by the Faculty of Engineering leading to the degrees of Master of Engineering and Doctor of Philosophy in Aeronautical, Civil, Electrical and Mechanical Engineering; to the degree of Master of Engineering in Materials Engineering, and, in co-operation with the Faculty of Science, to the degree of Master of Science in Information and Systems Science. In co-operation with the School of Computer Science, the Department of Mathematics and Statistics, and the University of Ottawa, the Faculty offers a joint program leading to the degree of Master of Computer Science. Joint programs in Civil, Electrical and Mechanical Engineering at both Masters and Ph.D. levels are offered in conjunction with the University of Ottawa. For further details, contact the Graduate Secretary, Faculty of Engineering, or refer to the Faculty of Graduate Studies and Research Calendar.

Academic and Professional Clubs and Societies

The following clubs and societies operating on the campus serve to broaden and enrich the curriculum and to offer students social activity and friendship related to their intellectual interests. The societies listed here are particularly pertinent for students registered in the Faculty of Engineering.

The Canadian Society of Mechanical Engineers — Student Section sponsors field trips, films and speakers on industrial and other aspects of mechanical engineering. Faculty Adviser: Dr. J. T. Rogers.

The American Society for Materials for students interested in Materials Engineering; students are invited to the monthly meetings of the Ottawa Valley chapter of ASM: Faculty Adviser, Dr. M. J. Bibby.

The Canadian Aeronautics and Space Institute meets monthly to provide a forum for discussion and dissemination of information on topics relating to aeronautics and space activities. Faculty Adviser: Dr. W.G. Richarz.

The Canadian Society for Civil Engineering promotes technical activities related to all areas of civil engineering, such as building design and construction, geotechnical engineering and transportation. The activities of this group are designed to enhance and broaden the student's appreciation of the profession. To this effect, speakers are brought to the Department of Civil Engineering to give seminars on current topics and visits are organized to construction sites and other facilities where civil engineering has played an important role. Faculty Adviser: Dr. S.J. Kennedy

The Carleton Student Engineering Society (C.S.E.S.) is open to all members of the University who are enrolled in Engineering courses. Through its academic and social activities, C.S.E.S. acts as a liaison between the students and the governing bodies of the University and promotes professional interest, high standards and a spirit of mutual assistance in the study of engineering.

The Institute of Transportation Engineers (I.T.E.) is an international organization of professional transportation engineers. The I.T.E. is organized into Districts, of which Canada is one, and into Sections, of which Ottawa is one. For students in transportation, there are Student Chapters, one of which is located on campus. The Chapter is closely associated with the local Section. Joint meetings are held once a month in Ottawa. The meetings have both a technical and social content. Membership in the Student Chapter is an excellent way of becoming part of the profession of transportation engineering. Students enrolled in the transportation program are eligible to join. Faculty Adviser: Dr. John P. Braaksma.

The Student Branch of the *Institute of Electrical and Electronics Engineers (I.E.E.E.)* organizes a series of events of both professional and general interest. Among these activities are an annual "Computer Faire", an employment workshop for upper-year students, an annual "papers" night and student-faculty get-togethers. Faculty Adviser: Dr. D. Walkey.

Engineering Common Core Committee

Members of Committee

M.J. Bibby, Chairman
G. Kardos (*Mechanical and Aerospace Engineering*)
D.C. Coll (*Systems and Computer Engineering*)
G.A. Hartley (*Civil Engineering*)
P.D. van der Puije (*Electronics*)

Common Core Courses Offered

Engineering 91.101★
Engineering Graphics

Introduction to engineering drawings; graphic media; orthographic projection; multiview representation; auxiliary views; sectional views; conventional practice; pictorial drawings, perspective, isometric, oblique; free-hand sketching; fundamentals of descriptive geometry.

Lectures and tutorials two hours a week, laboratory four hours a week.

Department offering course: Mechanical and Aerospace Engineering.

Engineering 91.102★
Orientation to Engineering

Introduction to engineering and design methods; written reports; report structure; other written communications; pictorial and graphical presentations; presentation of mathematical and other data; computer-aided drawings; dimensions, tolerances and fits; fasteners and welding; specialized and working drawings, structural, electrical, mechanical, schematics, maps.

Lectures and tutorials two hours a week, laboratory four hours a week.

Department offering course: Mechanical and Aerospace Engineering.

Engineering 91.111★
Mechanics — Statics

Definition of basic concepts: mass, force, moment, equilibrium. Scalars and vectors. Applications of vector operations in three-dimensional statics. Free-body diagrams. Equilibrium. Truss analysis. Beams, bending moment and shear force diagrams, distributed forces, centroids, moment of inertia. Hydrostatics. Friction. Introduction to engineering stress and strain. Deformable bodies.

One term: Lectures three hours a week, tutorials and problem analysis, three hours a week.

Department offering course: Civil Engineering.

Engineering 91.166★
Structured Problem Solving and Computers

Introduction to problem solving and engineering models. A structured approach to the solution of engineering problems by programming a computer. Programming in a high-level language (Pascal). Algorithm design, procedural and data abstraction, implementation, testing. Program style, documentation, reliability. Examples from science and engineering, including non-numerical examples.

Lectures and tutorial three hours a week; workshop one hour a week.

Department offering course: Systems and Computer Engineering.

Engineering 91.167★**Computers and Applications**

Basic computer organization; representation of numbers, operation codes. Assembly language. Engineering application using PASCAL; computer graphics, geometric transformations in 2D and 3D, examples from physics, geometry and engineering, solutions using some particular numerical algorithms.

Prerequisite: Engineering 91.166★.

Lectures and tutorial three hours a week; workshop one hour a week.

Department offering course: Systems and Computer Engineering.

Engineering 91.211★**Mechanics-Dynamics**

Kinematics and kinetics of particles: rectilinear and curvilinear motions; Newton's second law; energy and momentum methods. Kinematics and kinetics of rigid bodies: plane motion of rigid bodies; forces and accelerations; energy and momentum methods. Mechanical vibrations.

Prerequisites: Engineering 91.111★ and Mathematics 69.104★ and 69.114★.

Text: Meriam, *Engineering Mechanics, Volume II, Dynamics, SI/English version*.

One term: Lectures three hours a week, problem analysis three hours a week.

Department offering course: Mechanical and Aerospace Engineering.

Engineering 91.241★**Thermodynamics and Heat Transfer**

Basic concepts of thermodynamics: temperature, work, heat, internal energy and enthalpy. First law of thermodynamics for closed and steady-flow open systems. Thermodynamic properties of pure substances; changes of phase; equation of state. Second law of thermodynamics: concept of entropy. Simple power and refrigeration cycles. Introduction to heat transfer: conduction, convection and radiation.

Prerequisite: Engineering 91.111★.

Both terms: Lectures three hours a week, laboratory and problem analysis three hours a week.

Department offering course: Mechanical and Aerospace Engineering.

Engineering 91.251★**Circuits and Signals**

Nature and properties of signals. Fourier analysis. Circuit elements: definitions and basic properties. Voltage and current sources. Kirchhoff's laws, linearity, and superposition. Thevenin and Norton theorems: circuit simplification techniques; resistance circuits, AC signals; phasors. AC steady-state analysis: impedance, admittance and transfer properties; frequency response; detailed treatment of first order (RL and RC) circuits. Transient response: first-order circuits, form of response; initial and final condition; relation to AC steady-state properties. Properties of LR and CR circuits: AC steady-state response; resonance.

Prerequisites: Physics 75.100 and concurrent registration in Mathematics 69.201.

Text: Johnson, Hilburn and Johnson, *Basic Electric Circuit Analysis*.

Fall term: Lectures three hours a week, laboratory and problem analysis three hours a week.

Department offering course: Electronics.

Engineering 91.266★**Computer Methods in Engineering**

Introduction to FORTRAN. Errors: truncation and rounding. Modelling and analysis. Curve fitting; Lagrange formulation, Chebyshev and least squares fit; orthogonal polynomials. Numerical differentiation and integration. Solution of differential equations in engineering. Eigenvalues and eigenvectors. Use of spread-sheets and symbolic mathematics programs.

Prerequisites: Engineering 91.166★ and Mathematics 69.104★ and 69.114★.

Lectures three hours a week. Workshop one hour alternate weeks.

Department offering course: Systems and Computer Engineering.

Engineering 91.380★**Engineering Economics**

Resources and the role of the engineer. Fundamental economic and problem-solving concepts. Discounted cash flow mechanics. Economic analyses including structural, replacement and financial analyses and analysis of public projects. Management of money: depreciation and income tax considerations, estimating and forecasting, effects of inflation and sensitivity analysis. Economic decisions; break-even analysis, risk and uncertainty. Introduction to money value of time; production economy and resource management.

Prerequisite: Third-year registration.

Texts: Riggs, Rentz, Kahl and West, *Engineering Economics*, First Canadian Edition.

Fall term: Lectures three hours a week, problem analysis three hours alternate weeks.

Department offering course: Civil Engineering.

Concentration in Management Courses

Engineering 90.460★**Engineering Application of Operations Research**

Nonlinear programming, forecasting, decision analysis, game theory, reliability, equipment replacement, maintenance, simulation, cases and applications in management science.

Prerequisite: Engineering 94.320★

Department offering course: Civil Engineering

Engineering 90.461★**Principles of Finance**

Financial management of a firm, cost and structure of capital, dividend policy decisions, financial analysis and financial decisions of public enterprise, risk and assets evaluation, capital investment decisions, asset management problems.

Prerequisite: Engineering 91.380★, Business 42.101★, 42.102★.

Department offering course: Civil Engineering

Engineering 90.462★**Theories and Processes in Organizational Behaviour**

Macro theories of organization and organizational process, group dynamics; discussion of organizational processes such as conflicts and communication control organizational structure and design.

Prerequisite: Business 42.210★.

Department offering course: Civil Engineering

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A.P.S. Selvadurai
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Associate Professors

A.O. Abd El Halim
N.M. Holtz
A.G. Razaqpur

Assistant Professors

S.J. Kennedy
D.T. Lau

Adjunct Research Professors

C.M. Allen, *Adjeleian Allen Rubeli, Consulting Engineers*
W.F. Johnson, *Transport Canada*
K.T. Law, *National Research Council*
R.R. Mayes, *Transport Canada*
O.J. Svec, *National Research Council*
E.W. Wright, *E.W. Wright & Associates*

Sessional Lecturers

R. Gardner
D. Harvey
A. Perks
P. Pilon

Courses Offered

As a result of the transition from the old program to the new program there may be some duplication of course descriptions and alterations in the course numbering.

Engineering 82.104★

Surveying

Surveying principles and practice; measurements of distance, difference in elevation, angles and directions; theory, use and adjustments of principal surveying instruments; theory of errors and weighted measurements; engineering surveys, profile, cross sections, earth-work horizontal and vertical curves; use of rectangular coordinates in surveying; area computation by surveying methods; handling of equipment, note-keeping, and surveying procedures are stressed in the field work.

Text: Brinker, *Elementary Surveying*.

Lectures and field work three weeks at the end of the Winter term.

Engineering 82.220★

Mechanics of Materials I

Pin-jointed trusses: forces and stresses in members, safety factor, introduction to design, bolted and riveted connections. Bending and shearing stresses in beams by approximate methods. Stresses in thin-walled cylinders due to internal pressure and torsion. Mohr's circle for stress. Stress-strain relations. Bending stresses in beams. Circular members in torsion. Stress-strain relations in shear. Shearing stresses in beams. Mohr's circle for strain. Introduction to electric resistance strain gauges, principal stresses from strain rosette data. Ultimate loads in bending and torsion. Thermal stresses. Buckling of columns.

Prerequisite: Engineering 91.111★.

Text: Bowes, Russell and Suter, *Mechanics of Engineering Materials*.

Winter term: Lectures three hours a week, problem analysis and laboratory three hours a week.

Engineering 82.322★

Mechanics of Materials II

Torsion bars and helical springs, stresses due to torque on non-circular sections, membrane analogy, shear flow, elastic-plastic torsion. Bending and shear stresses in beams of non-symmetrical cross-sections. Properties of areas; principal axes, Mohr's circle of inertia, shear centre. Columns having partial end-constraint, eccentrically loaded columns, beam-columns. Energy methods, minimum potential energy, Castigliano's theorems. Fatigue: S-N curve, strength reduction factors, loads of varying amplitude. Failure theories.

Precludes additional credit for Engineering 88.322★.

Prerequisite: Engineering 82.220★.

Text: Bowes, Russell and Suter, *Mechanics of Engineering Materials*.

Fall term: Lectures three hours a week, problem analysis and laboratory three hours a week.

Engineering 82.323★

Structural Analysis I

Review of plane statics; analysis of statically determinate structures; strain energy, principle of virtual work; influence lines, structural deflections and deformations; degree of indeterminacy and stability of structural systems; analysis of statically indeterminate structures; elastic instability of structural elements.

Prerequisite: Engineering 82.322★.

Winter term: Lectures three hours a week, problem analysis three hours alternate weeks.

Engineering 82.324★

Introduction to Structural Design

An introduction to structural design intended to acquaint the student with building systems; bridges; Limit States Design; the design process; the determination of dead, live, snow, rain, wind, earthquake, and crane loads; design for lateral loads; preliminary analyses and the determination of maximum load effects; and an introduction to timber, masonry, concrete and steel design in Canada.

Text: *National Building Code of Canada and its Supplement, 1990*.

Fall term: Lectures two hours a week, laboratory and problem analysis two hours a week.

Engineering 82.325★

Design of Structural Steel Components

Design of axially loaded tension and compression members; design of beams in flexure; design of members subjected to combined compression and flexure; design of welded and bolted connections; design of plate girders. (Also listed as Architecture 77.316★.)

Prerequisites: Engineering 82.322★ and 82.324★.

Texts: Kulak, Adams and Gilmour, *Limit States Design in Structural Steel - SI Units*; CISC *Handbook of Steel Construction*.

Winter term: Lectures three hours a week, problem analysis three hours alternate weeks.

Engineering 82.326★

Design of Reinforced Concrete Components

Based on reinforced concrete behaviour in flexure, compression, shear and bond, analysis and design concepts are developed for beams, slabs, columns, walls and footings.

Prerequisite: Engineering 82.322★.

Texts: Pillai and Kirk, *Reinforced Concrete Design in Canada*; CAN3-A23.3-M84 *Design of Concrete Structures for Buildings*.

Winter term: Lectures three hours a week, problem analysis three hours alternate weeks.

Engineering 82.328★

Geotechnical Mechanics

Origin and classification of soils and rocks. Character of natural soil deposits. Soil water. Seepage and permeability of soils. Principle of effective stress. Stress-deformation and strength characteristics of soils and rocks. Consolidation characteristics of soils. Stress distribution in earth masses. Laboratory testing. (Also listed as Geography 45.424★ and Geology 67.417★.)

Prerequisite: Third-year registration.

Fall term: Lectures three hours a week, laboratory three hours alternate weeks.

Engineering 82.334★

Transportation Engineering and Planning

Transportation within the socio-economic environment. Transportation systems and components. Vehicle motion and flow. Transportation terminals. Operations plans. Transportation costs. Transportation demand. Supply of transportation. Transportation network flows. Environmental impacts. Introduction to planning, management and design process. (Also listed as Geography 45.434★.)

Precludes additional credit for Engineering 82.434★.

Prerequisite: Third-year registration.

Text: Paquette, Ashford and Wright, *Transportation Engineering, Planning and Design*, 1982.

Winter term: Lectures two hours a week, problem analysis three hours alternate weeks.

Engineering 82.337★

Municipal Engineering

Introduction to fundamentals of municipal engineering. City management; permits and approvals; water supply, treatment and distribution; sewage collection, treatment and disposal; solid waste management; snow disposal; protective services.

Prerequisite: Third-year registration.

Fall term: Lectures three hours a week, problem analysis three hours alternate weeks.

Engineering 82.420★

Structural Analysis II

Basic concepts of structural analysis; review of matrices and solution of equations; structural deformations and the virtual work method; force (flexibility) method of analysis; displacement (stiffness) method of analysis, important energy theorems, the moment distribution method; introduction to computer analysis of structures by the stiffness method. (Also listed as Architecture 77.314★.)

Prerequisite: Engineering 82.323★.

Fall term: Lectures three hours a week, problem analysis three hours alternate weeks.

Engineering 82.421★

Advanced Structural Analysis

Review of matrix force method, formulation of the matrix stiffness method; three-dimensional frames; computer analysis of structures; introduction to finite elements; structural dynamics.

Prerequisite: Engineering 82.420★.

References: Beaufait, *Basic Concepts of Structural Analysis*; Gere and Weaver, *Analysis of Framed Structures*.

Winter term: Lectures and tutorials two hours a week, problem analysis three hours alternate weeks.

Engineering 82.422★

Wood Engineering

Introduction to structural design in timber. Properties and anatomy of wood. Description of wood products. Factors affecting the strength and structural behaviour of wood structures. Strength evaluation and testing. Allowable stresses. Design in bending, compression and combined stresses. Design of trusses, frames, glulam structures, plywood components. Design of structural systems, formwork, foundations. Connections and connectors. Care, inspection, maintenance and repair of timber structures.

Prerequisite: Fourth-year registration or permission of the Department.

Fall term: Lectures two hours a week, problem analysis three hours alternate weeks.

Engineering 82.427★

Reinforced Concrete Design II

Prestressed concrete design including pre-tensioned and post-tensioned members, prestressing losses, cable profiles, ultimate strength, shear and diagonal tension, bond and end block considerations. Introductory concrete bridge design including bridge types, loadings, procedures for single span slab, T-beam and AASHTO girder bridges, diaphragms and bearing design. Basic building design in reinforced and prestressed concrete.

Prerequisite: Engineering 82.432★.

Text: Nilson, *Design of Prestressed Concrete*.

Winter term: Lectures two hours a week, problem analysis three hours alternate weeks.

Engineering 82.428★

Geotechnical Engineering

Waterflow through saturated soils. Laplace equation, flow nets, hydraulic instability. Earth pressures; at rest, active and passive conditions. Design of flexible and rigid retaining structures. Elastic equilibrium in soils. Stress distribution in soils. Settlement of foundations. Bearing capacity of footings. Pile foundations, group action, load distribution. Stability of earth slopes.

Prerequisite: Engineering 82.328★.

Text: Spangler and Handy, *Soil Engineering*, Fourth Edition.

Fall term: Lectures three hours a week, problem analysis three hours alternate weeks.

Engineering 82.429★

Highway Engineering

Highway planning, highway location and geometric design. Traffic engineering, highway capacity. Soil classifications, subgrade and base materials, highway drainage. Principles of frost action and applications to highway systems. Structural design methods for rigid and flexible pavements. Highway economics and finance. Maintenance and rehabilitation. Canadian experience.

References: Oglesky, *Highway Engineering*, Fourth Edition; Wright and Paquette, *Highway Engineering*, Fourth Edition; Yoder and Witzach, *Principles of Pavement Design*.

Winter term: Lectures two hours a week, problem analysis three hours alternate weeks.

Engineering 82.430★

Structural Planning in Architecture

The nature of structural planning problems; general criteria in structural planning; functional, technical, economic and form considerations; loads, classification and estimation; building codes, fire resistance requirements; structural systems; various classifications; comparative study; integration of structural systems with other building systems; synthesis, preliminary analysis and evaluation of alternative structural schemes; case studies. (Also listed as Architecture 77.424★.)

Prerequisites: Fourth-year registration, permission of the Department.

References: Schodek, *Structures*; White, Gergely, Sexsmith, *Structural Engineering*.

Winter term: Lectures two hours a week, problem analysis three hours alternate weeks.

Engineering 82.431★

Foundation Engineering

A critical study of the theories in soil mechanics and their application to the solution of geotechnical engineering problems. Field investigations, laboratory and field testing, special footings, mat foundations, caissons, pile foundations and excavations. Discussion of new methods and current research.

Prerequisite: Engineering 82.428★.

Text: Das, *Principles of Foundation Engineering*.

Winter term: Lectures two hours a week, laboratory three hours alternate weeks.

Engineering 82.432★

Reinforced Concrete Design I

Reinforced concrete applications. Design of two-way slabs, columns, deep beams and corbels, and shear walls. Design for torsion. Special seismic requirements. Maintenance of reinforced concrete structures. Introduction to behaviour and design of prestressed concrete.

Prerequisite: Engineering 82.326★

Texts: Pillai and Kirk, *Reinforced Concrete Design in Canada*; CAN3-A23.3-M-84 *Design of Concrete Structures for Buildings*.

Fall term: Lectures three hours a week, problem analysis three hours alternate weeks.

Engineering 82.433★

Urban Planning

A systematic approach to urban planning. Urbanization in Canada; urban sprawl; data collection; forecasting; standards; space requirements; land use; zoning; transportation; land development; site selection; land capability; layout; evaluation; housing; urban renewal and new towns. (Also listed as Geography 45.433★.)

Precludes additional credit for Engineering 82.333★.

Prerequisite: Third-year registration.

Winter term: Lectures two hours a week, problem analysis three hours alternate weeks.

Engineering 82.435★

Transportation Geography

Offered in the Department of Geography as Geography 45.442★.

Engineering 82.437★

Hydraulics of Municipal Waste Water Systems

Hydraulics of sewers flowing partially full, flow in sewer junctions and transitions; estimates of amounts of sanitary and storm sewage; design of sewage collection systems; pumps, control, and measuring devices. Hydraulics of treatment processes, disposal problems.

Prerequisite: Fourth-year registration.

Winter term: Lectures two hours a week, problem analysis three hours alternate weeks.

Engineering 82.438★

Structural Steel Design I

Steel building design: the design process, structural loads, gravity load design of floor systems, beams, girders, two cycle moment distribution; column gravity loads and moments and design; lateral loads; methods of lateral load resistance, design considerations; bracing system analysis for loads and drift; approximate frame analysis for loads and drift; approximate frame analysis for loads and drift; P - effect.

Prerequisite: Engineering 82.325★ and Fourth-year registration.

References: *National Building Code of Canada (1990)*; CISC, *Handbook of Steel Construction*.

Fall term: Lectures three hours a week, problem analysis three hours alternate weeks.

Engineering 82.439★

Structural Steel Design II

Bridge systems, review of various steel bridge types, and analysis and design considerations. Case studies of a rigid frame design, and a plate girder bridge design. Design considerations for cold-formed members. Computer software for the design of steel structures.

Prerequisite: Engineering 82.438★

Engineering 82.440★

Construction/Project Management

Systems approach to project planning and control. Analysis of alternative network planning methods: CPM, precedence and PERT. Planning procedure, computer techniques and estimating. Physical, economic and financial feasibility. Implementation feedback and control. Case studies.

Prerequisite: Fourth-year registration.

Text: Peurifoy, *Construction Planning Equipment and Methods*.

Fall term: Lectures two hours a week, problem analysis three hours alternate weeks.

Engineering 82.441★

Hydrology

Hydrologic cycle, stream flow, hydrology of snow, sub-surface water, hydraulics of wells, unit hydrograph and S-curve analysis of flood flows, infiltration, river and reservoir routing, introduction to statistical inference and time series analysis of hydrologic data. (Also listed as Geography 67.419★ and Geography 45.413★.)

Text: DeWeist, *Geohydrology*.

References: Gray, *Principles of Hydrology*; Bruce and Clark, *Introduction to Hydrometeorology*.

Fall term: Lectures two hours a week, problem analysis three hours alternate weeks.

Engineering 82.450★

Computer Methods in Civil Engineering

The application of computers to the solution of civil engineering problems for the areas of surveying, traffic simulation, fluid distribution and collection, structural analysis and geotechnical engineering (with network and flow analysis being a common theme). Emphasis is placed

on the careful design and implementation of reasonably large applications programs. Computing techniques include data structuring, data storage and data bases, and man-machine communication. Effective use of existing software is discussed.

Prerequisites: Engineering 94.265★ and Fourth-year registration.

Text: Lecture notes.

Fall term: Lectures three hours a week.

Engineering 82.495★

Professional Practice Seminar

This course is intended to familiarize future professional engineers with current engineering practice and its relationship to other disciplines and to society in general. A sequence of seminars is presented by faculty and external lecturers covering topics such as the Professional Engineers Act, professional ethics, responsibilities of professional engineers and engineering practice appropriate to the discipline. Also included are seminars on the impact of technology on society. The development of communication skills, both oral and written, is emphasized.

Precludes additional credit for Engineering 87.495★, 88.495★, 97.495★ and 94.495★.

Prerequisite: Fourth-year registration.

Winter term: Seminars three hours a week.

Engineering 82.496★

Special Topics in Civil Engineering

At the discretion of the Faculty, a course dealing with selected advanced topics of interest to Civil Engineering students may be offered.

Prerequisite: Permission of the Department.

Engineering 82.497

Engineering Project

As a part of the Fourth-year program, each student is required to select and complete a major project in engineering analysis, design, development or research. The objective is to provide an opportunity to develop initiative, self-reliance, creative ability and engineering judgment. The results must be submitted in a comprehensive report with appropriate drawings, charts, bibliography, etc. Each student is required to submit his or her engineering project proposal to the Chairman of the Department of Civil Engineering on or before the last day of classes in September.

Students enrolled in the Fourth-year Civil Engineering option may elect to satisfy the project requirements by successfully completing two workshop courses from "77" Series in the School of Architecture with the approval of the Chairman of the Department of Civil Engineering.

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C. Plett
T.J. Smy
D. Walkey

Instructor
T.G. Ray

Adjunct Research Professors
V. Makios, *University of Patros*
R.E. Thomas

Courses Offered

Engineering 97.257★ Electronics I

A course that treats the introductory aspects of electronics. The following topics are covered: Qualitative semiconductor physics, leading to the diode equation. Diode applications. Operational amplifiers and their application in feedback configurations including active filters. Junction field effect transistors: theory, biasing circuits, linear amplifier design. Metal-oxide-semiconductor field-effect transistors: theory and applications in linear circuits and digital gates. Digital circuits and applications in elementary combinational and sequential networks. Bipolar junction transistors, silicon controlled rectifiers and applications. Prerequisites: Engineering 91.251★ or 97.251★; Mathematics 69.201 (may be taken concurrently). Text: Sedra and Smith, *Micro-Electronic Circuits*, Second Edition. Winter term: Lectures three hours a week, laboratory and problem analysis three hours a week.

Engineering 97.350★ Digital Electronic Circuit Design

Aspects of design of digital integrated circuits as circuit blocks for the realization of required system functions are treated with project activities in the laboratory. Topics include MOS transistors as circuit elements, TTL, ECL, nMOS and CMOS logic gates, electrical and logic simula-

tion on computer workstations, MSI and LSI digital circuits, combinational and sequential design. Timing problems in digital design. VLSI design options. In the laboratory, students will design circuits and use schematic entry and automatic place and route to implement them in Logic Cell Arrays.

Prerequisites: Engineering 97.359★ and 94.367★. Texts: Sedra and Smith, *Micro-Electronic Circuits*, Second Edition, and course notes. Engineering 97.350★, Winter term: Lectures two hours a week, laboratory three hours a week.

Engineering 97.354★ Electromagnetic Theory

Vector analysis: gradient, divergence, curl and Laplacian. Divergence theorem, Stokes' theorem, Maxwell's equations. Electrostatic fields, Coulomb's law, Gauss' law, Poisson and Laplace equations. Image and iteration techniques. Boundary value problems. Force and energy. Magnetostatic fields, Ampere's law, Biot-Savart law. Time varying fields, skin effect, uniform plane waves. Precludes additional credit for Engineering 97.454★.

Prerequisites: Mathematics 69.201, Engineering 94.261★. Text: Sadiku, *Elements of Electromagnetics*. Winter term: Lectures and tutorials three hours a week, problem analysis three hours alternate weeks.

Engineering 97.359★ Electronics II

This course builds upon the material of Engineering 97.357★ and acts as a bridge between discrete and integrated circuits. The laboratory is design-oriented and includes both set laboratory exercises and project activities. Topics: Introduction to physical nature of semiconductor devices and integrated circuits. DC, small signal AC and switching properties of bipolar junction transistors. Linear amplifiers (small signal); high frequency response and bandwidth considerations; two-port analysis. Large signal amplifiers; class A, B and C operation; power amplifiers; transformer-less circuits. Feedback amplifiers and operational amplifiers; considerations of gain, sensitivity, distortion and stability. Frequency selective circuit design. Oscillators and multivibrators.

Prerequisites: Engineering 97.257★ and 94.260★. Text: Sedra and Smith, *Micro-Electronic Circuits*, Second Edition. Fall term: Lectures three hours a week, laboratory three hours a week.

Engineering 97.368★ Solid State Electronics

Fundamentals of solid-state physics as applied to semiconductors: energy bands; electrons and holes; doping; carrier drift and diffusion, recombination and generation. Theory of the pn junction: current flow in forward and reverse bias; small-signal capacitance; switching transients; voltage limitations. MOS capacitors: flatband and threshold voltages; use in process control. MOSFETs: first-order model; bulk-charge model; body effect; short channel effects. Basic principles of MOS IC fabrication. Bipolar junction transistors: Ebers-Moll model; operating regimes. Laboratory experiments illustrate principles of semiconductor device physics.

Prerequisite: Engineering 97.257★. Text: Pulfrey and Tarr, *Introduction to Microelectronic Devices*. Fall term: Lectures three hours a week, laboratory three hours alternate weeks.

Engineering 97.452★**Microwave Circuits**

Introduction to the principles of operation and the properties of important microwave tubes, semiconductor devices, and passive components. Scattering matrix description of microwave junctions. Properties of basic reciprocal and non-reciprocal passive microwave devices (hybrids, tuners, impedance transformers, cavities, filters, attenuators, isolators and circulators). Fundamentals of microwave amplifiers and oscillators. Design of solid-state microwave amplifiers and oscillators in coaxial, waveguide, and microstrip transmission media. Students will design, fabricate and test two microwave integrated circuits: a bandpass filter and a transistor amplifier.

Prerequisite: Engineering 97.453★.

Text: Ghandi, *Microwave Engineering and Applications*.

Winter term: Lectures three hours a week, laboratory three hours alternate weeks.

Engineering 97.453★**Radio Frequency Lines and Antennas**

Introduction to distributed circuits; transmission lines as distributed circuit elements, travelling waves and standing waves, reflection coefficient, standing wave ratio, impedance transformation, Smith charts, stub matching, quarter-wave transformers, half-wave filters, transients. Introduction to transmission lines: coaxial transmission lines, rectangular waveguide, waveguide resonators, optical fibers. Introduction to antennas: infinitesimal linear element, half-wave dipole, field equations, near and far fields, radiation resistance, gain, directivity, effective area. Introduction to linear arrays; array polynomial, broadside array, end-fire array. Laboratory on microwave measurements and techniques.

Prerequisite: Engineering 97.354★.

Text: Anderson, *Electric Transmission Line Fundamentals*.

Fall term: Lectures three hours a week, laboratory three hours alternate weeks.

Engineering 97.455★**Telecommunication Circuits**

A course of study of the commonly used circuit components in modern telecommunication systems. Both analogue and digital systems are included. The design of the hardware is emphasized. Examples are drawn from broadcasting, telephony and satellite systems.

Prerequisites: Engineering 97.359★ and 94.351★.

Winter term: Lectures three hours a week, laboratory three hours alternate weeks.

Engineering 97.456★**CAD for Communication Circuits**

Basic principles of Computer-Aided Design tools used for analysis and design of communication circuits and systems. Frequency and time-domain analysis. Noise and distortion analysis. Transmission line effects. Sensitivity analysis, and circuit performance optimization. Digital simulation. Application examples: line cards and equalizers; MOS and bipolar macromodels; VLSI and microwave circuits; fiber optic communication systems.

Prerequisites: Fourth-year registration.

Winter term: Lectures three hours a week, laboratory and problem analysis three hours alternate weeks.

Engineering 97.459★**Communication Links**

Transmission fundamentals; decibel, thermal noise, intermodulation noise, dB compression, third order intercept, dynamic range, SNR, NPR, noise figure, noise temperature, AM to PM conversion, antenna gain, EIRP, G/T, C/T. Line-of-sight microwave links; free space propagation loss,

earth's bulge, Fresnel clearance, FM transmitter, horn feeds, parabolic antennas, FM receiver, diversity techniques, fade margin, repeaters. Satellite links; earth space window, path loss, up and down link calculations, multiple accessing, earth station sub-systems. Fiber optic links; fiber types, connectors, sources, detectors, system design. Tropospheric scatter links; fading, path loss, take-off angle, equipment. Millimeter wave links; propagation, rainfall loss, systems, short hop. High-frequency radiolinks; ionosphere, skywaves, systems, rhombic and log periodic antennas, diversity techniques.

Prerequisite: Engineering 94.351★.

Text: Freeman, *Telecommunications Transmission Handbook*, Second Edition.

Winter term: Lectures three hours a week, laboratory and problem analysis three hours alternate weeks.

Engineering 97.460★**Radar and Navigation**

Radar: operation, range equation, minimum detectable signal, pulse integration, radar cross section, pulse repetition frequency, range ambiguities, propagation effects. Surveillance Radars: Moving Target Indicator (MTI) and Pulse Doppler operation, delay line cancellers, range gated Doppler filters, MTI improvement factor, subclutter visibility, tracking with surveillance radars. Radio Navigation: pulsed and CW operation, range-range and hyperbolic lines of position, accuracy lobes. Operational systems: Loran C, Omega, VOR/DME, TACAN, Global Positioning System. Inertial Navigation: initial alignment, platform axis and navigation co-ordinate system, gyro drift, accelerometers, rotational averaging, ring laser gyros.

Prerequisites: Engineering 94.351★ and 97.453★

Winter term: Lectures three hours a week, laboratory and problem analysis three hours alternate weeks.

Engineering 97.469★**Integrated Circuit Technology I**

Basic integrated circuit fabrication for circuit designers. MOS circuit design methods; specification, schematic capture, circuit simulation; inverter and gate design. Non-ideal effects – series resistances and parasitic capacitances, delay and matching. Mask level layout of integrated circuits. Analysis of transient performance of MOS integrated circuits. The ASIC industry.

Prerequisites: Engineering 97.368★ and 97.350★

Fall term: Lectures three hours a week, laboratory and problem analysis three hours alternate weeks.

Engineering 97.470★**Integrated Circuit Technology II**

Basic processing steps used in the fabrication of silicon integrated circuits (ICs): oxidation, diffusion, ion implantation, epitaxy, thin film deposition, photolithography and etching. Computer-aided process design and modelling; SUPREM and MINIMOS simulation. Bipolar transistor theory and design. Device testing and characterization. Laboratory work involves the design and layout of a simple integrated circuit which will be fabricated in the Department, followed by testing and evaluation of performance of the completed IC.

Prerequisite: Engineering 97.469★

Winter term: Lectures three hours a week, laboratory and problem analysis three hours alternate weeks.

Engineering 97.475★**Electronic Properties of Materials**

The course is concerned with basic physical mechanisms and material properties for the solid materials that find application in electronics. Review of solid-state theory. Conduction and conducting materials. Insulators; conduct-

ing mechanisms, dielectric properties. Elemental (Ge, Si) and compound (GaAs and other) semiconductors: conduction mechanisms, Hall effect, excitation and absorption, photo conductivity; light emission, lasers; photodetectors, solar cells. Semiconductor transducers.

Prerequisite: Engineering 97.368★

Winter term: Lectures three hours a week, laboratory and problem analysis three hours alternate weeks.

Engineering 97.476★

Digital Integrated Electronics

This course is intended to follow Engineering 97.350★, Digital Electronic Circuit Design, and to be concerned with the internal operation and architectures of modern digital ICs, and also advanced digital design and interfacing techniques. Consideration is given to design with both standard IC components and custom LSI logic. An important aspect of the course is the laboratory. A hardware development facility including microprocessor workstations, a PC network for program development and logic analysers is available.

Prerequisites: Engineering 97.350★ and 94.461★.

Winter term: Lectures three hours a week, laboratory and problem analysis three hours alternate weeks.

Engineering 97.477★

Analog Integrated Electronics

A course that develops on the linear integrated circuit aspects covered in Engineering 97.359★, with particular emphasis on integration of analog signal processing techniques in monolithic MOS ICs. Op amp design. Basic sampled data concepts, Z-transform analysis, switched capacitor filters, more complex circuits. Noise aspects, including dynamic range and signal to noise ratio.

Prerequisite: Engineering 97.359★.

Fall term: Lectures three hours a week, laboratory and problem analysis three hours alternate weeks.

Engineering 97.478★

Advanced Digital Integrated Circuit Design

Introduction to CMOS VLSI design; Switching characteristics of CMOS logic circuits; performance estimation and optimization; structured design and test, Computer-Aided Design tools, design for testability; subsystem design, arithmetic and logic circuits, data paths, memories, programmable logic arrays, systolic arrays and neural networks.

Prerequisites: Fourth-year registration and Engineering 97.350★.

Winter term: Lectures three hours a week, laboratory and problem analysis three hours alternate weeks.

Engineering 97.485★

Instrumentation, Measurement and Data Handling

Introduction to the use of electronic building blocks in measurement, signal processing and data handling. Electronic sensors and transducers: magnetic, piezoelectric, resistive, optical; silicon transducers. Operational amplifier fundamentals: offsets, slew rate, clipping, noise. Operational amplifier circuits: active filters, waveform generators, current-to-voltage conversion, adders and subtractors. Digital logic: maps, SSI gates, counters, shift registers, MUX, digital readouts. Microcomputers: internal block architecture, addressing and connecting memory, bus signals, interfacing: A to D and D to A conversion.

Precludes additional credit for Engineering 97.257★.

Prerequisites: Engineering 91.251★, Mathematics 69.201 (may be taken concurrently).

Not available for credit for Electrical Engineering or Computer Systems Engineering students.

Fall term: Lectures three hours a week.

Engineering 97.495★

Professional Practice Seminar

This course is intended to familiarize future professional engineers with current engineering practice and its relationship to other disciplines and to society in general. A sequence of seminars is presented by faculty and external lecturers covering topics such as the Professional Engineers Act, professional ethics, responsibilities of professional engineers and engineering practice appropriate to the discipline. Also included are seminars on the impact of technology on society. The development of communication skills, both oral and written, is emphasized. (Also listed as Engineering 94.495★.)

Precludes additional credit for Engineering 82.495★, 87.495★ and 88.495★.

Prerequisite: Fourth-year registration.

Winter term: Seminars three hours a week.

Engineering 94/97.496★

Special Topics in Electrical and Computer Systems Engineering

At the discretion of the Engineering Faculty Board, a course dealing with selected advanced topics of interest to Electrical and Computer Systems engineering students may be offered.

Prerequisites: Fourth-year registration.

Winter term: Lectures three hours a week, laboratory and problem analysis three hours alternate weeks.

Engineering 97.497 or 97.498

Engineering Project

As part of the Fourth-year program, each student is required to select and complete a major project in engineering analysis, design, development or research. The objective is to provide an opportunity to develop initiative, self-reliance, creative ability and engineering judgment. The results must be submitted in a comprehensive report with appropriate drawings, charts, bibliography, etc. Each student is required to submit his or her engineering project proposal to the Chairman of the Department of Electronics on or before the last day of classes in September.

Note:

Students in the Electrical Engineering degree program whose engineering project is under the supervision of a faculty member within the Department of Electronics should register in Engineering 97.497; those whose project is under the supervision of a faculty member in the Department of Systems and Computer Engineering should register in Engineering 94.497.

Students in the Computer Systems Engineering degree program whose engineering project is under the supervision of a faculty member within the Department of Electronics should register in Engineering 97.498; those whose project is under the supervision of a faculty member in the Department of Systems and Computer Engineering should register in Engineering 94.498.

Department of Mechanical and Aerospace Engineering

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Mackenzie Building, Room 203
Telephone: 788-5684
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Officers of Instruction

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Lecturer
P.R. Frise

Adjunct Professors
M.C. deMalherbe
W.J. Rainbird

Adjunct Research Professors
H. Moustapha, *Pratt & Whitney Canada*
W. Tyson, *Energy, Mines and Resources*
W. Wallace, *National Research Council*

Sessional Lecturers
R.I. Hodge
F. Moaddel

Courses Offered

Engineering 88.230★
Introductory Fluid Mechanics
Fluid properties. Units. Fluid statics; pressure distribution in fluid at rest; hydrostatic forces on plane and curved surfaces; buoyancy. Kinematics and dynamics of fluid motion: concepts of streamline, control volume, steady and one-dimensional flows; continuity, Euler, Bernoulli, steady flow energy, momentum and moment of momentum equations; applications.
Prerequisites: Mathematics 69.104★ and 69.114★ and Engineering 91.111★.
One term: Lectures three hours a week, laboratory and problem analysis three hours a week. Offered both terms.

Engineering 88.270★

An Introduction to Engineering Materials

Materials (metals, alloys, polymers, ceramics, glasses, composites) in engineering service; relationship of interatomic bonding, crystal structure and defect structure (vacancies, dislocations) to material properties; polymers, thermoplastic, thermosetting, viscoelastic, viscoplastic behaviour; phase diagrams and alloys; microstructure control (heat treatment); composites, reinforcement, laws of mixtures; material failure: fracture, fatigue, creep, corrosion. Precludes additional credit for Engineering 88.271★, 88.470★.

Prerequisites: Physics 75.100, Chemistry 65.111★ and Mathematics 69.104★.

Text: Van Vlack, *Materials Science and Engineering*, Fifth Edition.

Winter term: Lectures three hours a week, problem analysis and laboratories three hours a week.

Engineering 88.271★

An Introduction to Electrical Engineering Materials

Structure and properties of materials (metals, alloys, polymers, ceramics, glasses, composites) used in electrical engineering; interatomic bonding – delocalized electrons, elementary band structure; crystal structure, directions, planes, silicon diamond cubic structure; atomic vibrations and heat transfer; polymers – thermosetting, thermoplastic, viscoelastic behaviour; ceramic and glass structures; dielectric polarization and materials; magnetic materials, hysteresis, domain behaviour; piezoelectric behaviour, transducers, oscillator material behaviour; optical materials, birefringence, colour centres, lasers; composites, mixture rules, filament structures.

Precludes additional credit for Engineering 88.270★, 88.470★.

Prerequisites: Physics 75.100, Chemistry 65.111★ and Mathematics 69.104★.

Text: Van Vlack, *Materials Science and Engineering*, Fifth Edition.

Winter term: Lectures three hours a week, problem analysis one and one-half hours a week.

Engineering 88.302★

Machine Design and Practice

The design of mechanical machine elements is studied from a theoretical and practical point of view. Topics covered are: design factors, fatigue, shafting, springs, gearing, bearings, flexible drive elements, brakes and clutches, fasteners and welded structures. Problem analysis emphasizes the application to real mechanical engineering problems.

Text: Deutschman et al., *Machine Design*.

Winter term: Lectures three hours a week, problem analysis three hours a week.

Engineering 88.304★

Dynamics of Machinery

Kinematic and dynamic analysis and synthesis of mechanisms and machines. Design and analysis considerations in reciprocating and rotating machinery. Vibrations in machinery, vibrations of systems with more than one degree of freedom. Vibration and shock isolation. Experimental investigation of dynamic systems.

Prerequisite: Engineering 91.211★.

References: Martin, *Kinematics and Dynamics of Machines*; Thomson, *Vibration Theory and Applications*.

Winter term: Lectures three hours a week.

Engineering 88.322★

Solid Mechanics I

This course builds upon the material of Engineering 82.220★ and provides the essential fundamentals of engineering solid mechanics. Topics include: elementary theory of elasticity; torsion and bending of non-circular sections; energy methods; thin plates and shells; plastic collapse; and introduction to creep analysis.

Precludes additional credit for Engineering 82.322★.

Prerequisite: Engineering 82.220★.

Fall term: Lectures three hours a week, problem analysis and laboratory three hours a week.

Engineering 88.333★

Fluid Mechanics

Review of the fundamental equations for one-dimensional ideal fluid flow. Dimensional analysis and similitude. Viscous flow theory. Boundary layer concept. One-dimensional steady isentropic flow; normal shock waves. Open channel flow. Two-dimensional potential flow theory.

Prerequisite: Engineering 88.230★.

Fall term: Lectures three hours a week, problem analysis and laboratory three hours a week.

Engineering 88.340★

Applied Thermodynamics

Mixture of perfect gases and vapours, psychrometry, combustion processes, differences between real and ideal cycles, gas cycles and vapour cycles for power and refrigeration plant, principles of turbomachines.

Prerequisites: Engineering 91.241★ and Third-year registration.

Reference: Rogers and Mayhew, *Engineering Thermodynamics, Work and Heat Transfer*.

Winter term: Lectures three hours a week.

Engineering 88.352★/88.452★

Feedback Control Systems

Control systems and terminology. Design of automatic control systems; analysis and synthesis, transfer function, stability. Laplace and Fourier transforms, time and frequency design techniques, performance criteria. Linear and non-linear systems. State variables. Discrete and digital systems; z-transforms. Control system components: hydraulic, pneumatic, electronic. Introduction to micro-processors and their applications. Automation of industrial processes.

Prerequisites: Mathematics 69.375★ and Engineering 94.260★.

Texts: Hostetter, Savant, Stefani, *Design of Feedback Control Systems*; Dorf, *Modern Control Systems*.

Reference: Shinnars, *Modern Control System Theory and Applications*.

Winter term: Lectures three hours a week.

Engineering 88.370★

Principles of Manufacturing Engineering

Manufacturing unit processes and material considerations. Casting techniques: solidification and heat flow theory, defect formation, casting design. Metal forming: elementary plasticity theory, plastic failure criteria, force and work calculations. Powder-forming techniques: theory and practice of powder consolidation, design considerations. Joining techniques: heat flow and defect formation theory, residual stresses. Machining theory and practice. Heat treatment and surface hardening: diffusion theory, principles of wear resistance.

Prerequisite: Engineering 88.270★.

Text: Bibby, *Principles of Manufacturing Engineering*.

Fall term: Lectures and tutorials three hours a week.

Engineering 88.390★

Mechanical Engineering Laboratory I

A laboratory course in which each student performs a series of laboratory exercises dealing with a wide range of mechanical engineering topics. This course is intended to give students the opportunity to relate theory and practice and to provide experience with modern engineering equipment and measurement techniques. Good reporting practice is emphasized.

Winter term: Laboratory six hours a week.

Engineering 88.403★

Mechanical Systems Design

The course emphasizes the design of mechanical systems. Topics to be covered include: establishing design criteria, conceptual design, design economics, value analysis, synthesis, optimization. The problem analysis involves synthesis of real life mechanical systems.

Prerequisite: Engineering 88.302★.

Reference: Selected readings from *Machine Design*.

Fall term: Lectures three hours a week, problem analysis three hours a week.

Engineering 88.406★

Vehicle Engineering I

The course emphasizes the engineering and design principles of road transport technology. Topics to be covered include: performance characteristics, handling behaviour and ride quality of road vehicles. The prediction and evaluation of the performance of road transport systems are included.

Prerequisites: Engineering 91.211★ and Third- or Fourth-year registration.

Text: Wong, *Theory of Ground Vehicles*.

Winter term: Lectures three hours a week.

Engineering 88.407★

Vehicle Engineering II

The course emphasizes the engineering and design principles of off-road transport technology and air cushion technology. Topics to be covered include: the mechanics of vehicle-terrain interaction – terramechanics, performance characteristics of off-road vehicles, steering of tracked vehicles, air cushion systems and their performance. The prediction and evaluation of the performance of off-road transport systems are included.

Prerequisites: Engineering 91.211★ and Third- or Fourth-year registration.

Text: Wong, *Theory of Ground Vehicles*.

Reference: Wong, *Terramechanics and Off-Road Vehicles*

Winter term: Lectures three hours a week.

Engineering 88.411★

Strength Analysis

This course is intended to extend the student's ability in design and stress analysis of machine structures. Topics include: theory of elasticity, stress function approach in elasticity, stress concentrations, experimental stress analysis, plasticity, introduction to creep analysis, bending of thin axisymmetric plates and shells and introduction to the finite element method of stress analysis.

Prerequisite: Engineering 88.322★.

References: Budynas, *Advanced Strength and Applied Stress Analysis*; Juvinall, *Stress, Strain and Strength*.

Fall term: Lectures three hours a week.

Engineering 88.412★

Failure Analysis and Fracture Control

An introduction to the analysis and prevention of metal failures. Beginning with a consideration of the micro-mechanisms by which fracture occurs, the conditions that

lead to growth of cracks are outlined. The discipline of fracture mechanics is introduced to characterize mechanical conditions at the tip of a crack, and to provide the necessary framework for discussion of fatigue crack propagation and environment-assisted cracking. Design methods to avoid fracture through intelligent materials selection and prediction of lifetime to failure from unavoidable defects are introduced.

Text: *Engineering 88.412 Failure Analysis Manual*.

References: Rolfe and Barsom, *Fracture and Fatigue Control in Structures*; Knott, *Fundamentals of Fracture Mechanics*; Hertzberg, *Deformation and Fracture Mechanics of Engineering Materials*.

Winter term: Lectures three hours a week.

Engineering 88.414★

Vibrations in Mechanical Systems

Transient vibrations of single-degree-of-freedom systems. Free and forced vibrations of two-degrees-of-freedom systems. Numerical methods for multi-degree-of-freedom systems; influence coefficients; Dunkerley's equation; orthogonality of principal modes; method of matrix iteration; the Holzer-type problem; geared and branched systems. Vibration of continuous systems; longitudinal and torsional vibration of rods; lateral vibration of beams. Modal analysis techniques; non-linear vibration.

Prerequisite: Engineering 88.304★.

Reference: Rao, *Mechanical Vibrations*.

Fall term: Lectures three hours a week.

Engineering 88.430★

Acoustics and Noise Control

Behaviour of sound waves, properties of acoustic sources. Sound in small and large enclosures, properties of acoustic materials. Interaction with solid structures, and inhomogeneous media. Case studies: noise impact, traffic noise, concepts of noise control.

Prerequisite: Mathematics 69.375★.

Reference: Hemond, *Engineering Acoustics and Noise Control*.

Winter term: Lectures three hours a week.

Engineering 88.432★

Fundamentals of Fluid Dynamics

Differential equations of fluid motion. Subsonic flow: potential flow theory; outline of panel methods and flows over wings and bodies. Supersonic flow: oblique shock waves and Prandtl-Meyer expansions; flows over wings and bodies. Viscous flow: the boundary-layer approximation; outline of boundary-layer calculation methods; coupling of viscous and inviscid regions of flow.

Prerequisite: Engineering 88.333★.

References: Kuethe and Chow, *Foundations of Aerodynamics*; Liepman and Roshko, *Elements of Gas Dynamics*; White, *Viscous Fluid Flow*.

Fall term: Lectures three hours a week.

Engineering 88.435★

Fluid Machinery

Types of fluid machines. Dimensional analysis and similarity, performance parameters, performance characteristics, running points. Cavitation. Velocity triangles, Euler pump and turbine equation, impulse and reaction. Radial-flow pumps, fans and compressors: analysis, design and operation. Radial-flow and mixed-flow turbines. Axial-flow pumps, fans and compressors: analysis and design by cascade and blade-element methods, staging, off-design performance. Axial-flow turbines. Fluid couplings and torque converters.

Prerequisite: Engineering 88.333★.

Reference: Dixon, *Fluid Mechanics, Thermodynamics of*

Turbomachinery.

Fall term: Lectures three hours a week.

Engineering 88.437★

Mechanics of Flight

Elements of airplane aerodynamics; static stability and control. Performance analysis, including drag estimation, speed, payload, range, endurance, take-off and landing. Introduction to operating economics.

Prerequisite: Engineering 88.333★.

References: Anderson, *Introduction to Flight*; McCormick, *Aerodynamics, Aeronautics and Flight Mechanics*.

Winter term: Lectures three hours a week.

Engineering 88.441★

Power Plant Analysis

Criteria of merit; selection of power plant for transportation and power generation applications; interrelation among mechanical, thermodynamic and aerodynamic design processes; jet propulsion, turbojets and turbofans; alternative proposals for vehicular power plant; combined cycle applications.

Precludes additional credit for Engineering 87.442★.

Reference: Cohen, Rogers and Saravanamuttoo, *Gas Turbine Theory*.

Prerequisite: Engineering 91.241★. Fall term: Lectures three hours a week.

Engineering 88.443★

Energy Conversion and Power Generation

Energy sources and resources. Basic elements of power generation. Hydro-electric, fossil-fuel and fissile-fuel power plants. Other methods of conversion. Future methods of conversion. Economic and environmental considerations. Power generation systems. Future power needs.

Prerequisite: Engineering 91.241★.

Winter term: Lectures three hours a week, power plant visits.

Engineering 88.446★

Heat Transfer

An introduction to the mechanisms of heat transfer with emphasis on the basic fundamentals and practical solutions. Steady and transient conduction: solution by analytical and numerical methods and electrical analog techniques. Convective heat transfer: free and forced convection for laminar and turbulent flows; heat exchangers. Heat transfer by radiation between black and grey surfaces, radiation shields, solar radiation. Boiling and condensation heat transfer. Selected applications are covered.

Prerequisites: Engineering 88.333★ and Fourth-year registration.

Fall term: Lectures three hours a week.

Engineering 88.447★

Heating, Ventilating and Air Conditioning

Comfort. Environmental demands for residential, commercial and industrial systems. Methods of altering and controlling environment. Air distribution. Refrigeration methods, equipment and controls. Integrated year-round air-conditioning and heating systems; heat pumps. Cooling load and air-conditioning calculations. Thermal radiation control. Component matching. System analysis and design.

Prerequisites: Engineering 91.241★ and Third-year registration.

Winter term: Lectures three hours a week.

Engineering 88.453★

An Introduction to Robotics

Introduction to robotics with emphasis on applications. Kinematics and dynamics of robots and manipulators. Mo-

tion trajectories. Object and task description. Motion between positions. Control. Steady-state Servo errors. Steady-state velocity and acceleration errors. Applications of microprocessors for robots and manipulator control. Actuators of robots. Sensors of robots. Compliance. Programming. Robot applications in manufacturing and other industries.

Prerequisites: Mathematics 69.375★ and Engineering 94.260★.

Text: Coiffet and Chirouze, *An Introduction to Robot Technology*.

Winter term: Lectures three hours a week.

Engineering 88.464★

Finite Element Methods in Mechanical Engineering

Introduction to finite element methodology with emphasis on applications to stress analysis, heat transfer and fluid flow using the simplest one- and two-dimensional elements. Direct equilibrium, variational and Galerkin formulations. Computer programs and practical applications. Higher order elements.

Winter term: Lectures three hours a week.

Engineering 88.468★

Advanced Engineering Materials

This course presents an overview of the mechanical properties of engineering materials, as a basis for materials selection and design in computer-integrated manufacturing. The first part of the course considers the phenomenological aspects of strength, fracture, fatigue and corrosion/wear; test methods, materials properties and use of data bases. The second part covers the structure and deformation/fracture mechanisms of engineering materials-metals and alloys, ceramics, polymers, rapidly-solidified alloys, surface-modified materials, cellular solids, composite materials.

Precludes additional credit for Engineering 88.568★ or 88.473★.

Prerequisite: Engineering 88.270★.

Texts: LeMay, *Principles of Mechanical Metallurgy*; Ashby and Jones, *Engineering Materials 2: An Introduction to Microstructures, Processing and Design*.

Fall term: Lectures three hours a week.

Engineering 88.474★

Computer-Integrated Manufacturing Systems (CIMS)

The course presents an overview of the topics essential to CIMS. These include computer graphics, geometric modelling, kinematic analysis, numerically controlled machining, robotics, and flexible manufacturing systems, with the objective of understanding the fundamental data structures and procedures that are appropriate to the computerization of engineering design, analysis and production.

Precludes additional credit for Engineering 88.472★ (no longer offered) or 88.574★.

Prerequisite: Engineering 88.370★.

Winter term: Lectures three hours a week.

Engineering 88.475★

CAD/CAM

Fundamentals of computer aided design (CAD): review of the design process, elements of computer graphics including hardware and software standards. Wire frames, boundary representations, constructive solids geometry, sculptured surfaces. Data bases. Graphics and product interchange files. Fundamentals of computer aided manufacturing (CAM): numerical control (NC), CNC, DNC, adaptive control. CAM programming. Introduction to popular commercial CAD programs. Management issues including acquisition, training and security.

Text: Hearn and Baker, *Computer Graphics*.

Winter term: Lectures three hours a week.

Engineering 88.491★

Mechanical Engineering Laboratory II

A laboratory course in which each student performs a series of laboratory exercises dealing with a wide range of mechanical engineering topics. This course is intended to give students the opportunity to relate theory and practice and to provide experience with modern engineering equipment and measurement techniques. Good reporting practice is emphasized.

Fall term: Lectures and tutorials one hour a week, laboratory five hours a week.

Engineering 88.495★

Professional Practice Seminar

This course is intended to familiarize future professional engineers with current engineering practice and its relationship to other disciplines and to society in general. A sequence of seminars is presented by faculty and external lecturers covering topics such as the Professional Engineers Act, professional ethics, responsibilities of professional engineers and engineering practice appropriate to the discipline. Also included are seminars on the impact of technology on society. The development of communication skills, both oral and written, is emphasized.

Precludes additional credit for Engineering 82.495★, 87.495★, 94.495★ and 97.495★.

Prerequisite: Fourth-year registration.

Winter term: Seminars three hours a week.

Engineering 88.497

Engineering Project

As part of the Fourth-year program, each student is required to select and complete a major project in engineering analysis, design, development or research. The objective is to provide an opportunity to develop initiative, self-reliance, creative ability and engineering judgment. The results must be submitted in a comprehensive report with appropriate drawings, charts, bibliography, etc. Each student is required to submit his or her engineering project proposal to the Chairman of the Department of Mechanical and Aerospace Engineering on or before the last day of classes in September.

Engineering 87.302★

Aerospace Design and Practice

Influence of mission, aerodynamic, structural and regulatory requirements on vehicle configuration. Review of stress and deflection analysis of structures. Bending and torsion of box beams. Shear flow, shear centre, elastic axis and warping in thin wall structures. Stress and load in frames and ring-like structures. Problems of thin plates in stretching, bending, and buckling. Membrane stresses in shells. Fatigue. Design procedures for fatigue loading. Fracture mechanics and crack propagation.

Prerequisite: Third-year registration.

Engineering 87.370★

Aerospace Materials and Manufacturing Methods

Properties and behaviour of aluminum, magnesium and titanium alloys; specialty alloys for gas-turbine engines; fibre and matrix materials for composites, behaviour of composite components. Fastening methods; mechanical, bonding, welding. Machining and deformation processes. Automated methods for manufacture of composite components. Quality control requirements and procedures.

Materials testing.

Prerequisite: Engineering 88.270★.

Engineering 87.403★

Aerospace Systems Design

Flight vehicle aerodynamic, thermal and inertia loads. Velocity-load factor diagram. Review of airworthiness regulations. Certification procedures. Component and full-scale testing. Fatigue, fail-safe, and damage tolerant design procedures. Analysis of system reliability. Selected case studies are examined. Design studies are undertaken of major aircraft and spacecraft components.

Prerequisite: Engineering 87.302★ or 88.302★.

Not offered 1990-91.

Engineering 87.411★

Lightweight Structures

Structural concepts; two- and three-dimensional stress-strain relationships; theory of elasticity; bending, torsion and shear in thin-walled beams having single or multi-cell sections; work and energy principles; deformation and force analysis of advanced structures, including stiffened thin-wall panels (flexibility, Rayleigh-Ritz and stiffness methods); finite element methods. Stability and buckling of thin-walled, reinforced structures; influence of pressurization.

Prerequisite: Engineering 88.322.

Not offered 1990-91.

Engineering 87.432★

Applied Aerodynamics and Heat Transfer

Differential equations of motion. Subdivision of flow into viscous and inviscid regions. Potential flow: superposition of simple potential flows; thin airfoil theory; finite wing theory. Viscous flow: thin shear layer approximations; integral and differential methods; laminar boundary layers; transition; the closure problem in turbulent flows; jets and wakes. Convective heat transfer: the thermal boundary layer; free convection. Compressible flow: one-dimensional isentropic flow; effects of friction and heat transfer; shock waves and expansions; two-dimensional supersonic flow. Introduction to hypersonic and rarefied gas flows. Convective heat transfer in high-speed flow: recovery factor.

Prerequisite: Engineering 88.333★.

Not offered 1990-91.

Engineering 87.434★

Computational Fluid Dynamics

Review of differential equations of motion. Numerical integration of ordinary differential equations: momentum integral equation for laminar and turbulent boundary layers. Singularity and finite-difference methods for potential flows; two- and three-dimensional panel methods; vortex lattice methods. Finite-difference methods for second-order partial differential equations; boundary layers; parabolized and full Navier-Stokes equations; transonic small-disturbance equations. Method of characteristics. Panel methods for supersonic flows. The course will involve several computer-based assignments.

Prerequisite: Engineering 87.432★.

Not offered 1990-91.

Engineering 87.436★

Aircraft and Spacecraft Performance and Dynamics

Morphology of flight vehicles: basic components of fixed and rotary wing aircraft and spacecraft and their function. Historical development. Performance analysis of fixed wing aircraft: drag estimation, thrust generation, take-off and landing, rate of climb, speed, endurance, payload/range and steady state manoeuvres; operational economics. Performance analysis of rotor craft: rotor-blade motion, hover-

ing and vertical ascent, forward flight, and autorotation; factors limiting performance. The basics of rocket propulsion; escape velocity; introductory orbital dynamics.

Prerequisite: Engineering 88.333★.

Not offered 1990-91.

Engineering 87.438★

Stability and Control of Aircraft

Static stability and control: force and moment equilibrium requirements; longitudinal stability requirements; neutral points. Manoeuvring flight (turns and pull-ups); control forces and control power requirements; flight envelope diagram. Directional stability and control; roll control; fin, rudder, aileron and dihedral requirements. Introduction to dynamic stability: axis systems; remarks on governing equations; phugoid and short period modes; lateral dynamic modes. Influence of airframe flexibility. Ground-based model testing; full-scale flight testing.

Prerequisite: Engineering 88.333★.

Not offered 1990-91.

Engineering 87.442★

Aerospace Propulsion

Propulsion requirements, effects of Mach Number, altitude, and application; basic propeller theory; propeller, turboshaft, turbojet, turbofan and rocket; cycle analysis and optimization for gas turbine power plant; inter-relations between thermodynamic, aerodynamic and mechanical designs; rocket propulsion; selection of aero engines. Precludes additional credit for Engineering 88.441★.

Prerequisites: Engineering 88.333★ and 88.340★.

Not offered 1990-91.

Engineering 87.454★

Avionics Systems

Historical developments and overview of requirements. Air data sensing and display. Communications systems. Navigation and landing systems; ground-based, inertial and satellite systems. Guidance and control for aircraft, rockets and spacecraft: autopilots; stability augmentation; active control; station and position keeping; sensor requirements; display techniques. Remote sensing. The emphasis in the course is on the physical principles on which the various systems are based and on vehicle/systems integration.

Prerequisites: Engineering 88.333★ and 97.485★.

Not offered 1990-91.

Engineering 87.462★

Introductory Aeroelasticity

Review of structural behaviour of lifting surface elements; bending, torsion, mass distribution, mode shapes and frequencies. Introduction to unsteady aerodynamic derivatives, reduced frequency dependence, compressibility effects. Outline of classical flutter analysis and brief introduction to discretization schemes. Some examples of aeroelastic effects on flight vehicles; on static and dynamic stability, wing divergence and aileron reversal, bending-torsion flutter of high aspect ratio lifting surfaces (the "flutter" engine), influence of stores configuration, flap-lag and pitch-lag instability of rotors. Test methods; aeroelastically scaled models in wind tunnels, flight flutter testing. Limitations to flight envelope of aircraft and rotorcraft due to aeroelastic effects.

Prerequisites: Engineering 87.302★ and 88.333★.

Not offered 1990-91.

Engineering 87/88.496★

Special Topics In Mechanical and Aerospace Engineering

At the discretion of the Faculty, a course dealing with selected advanced topics of interest to Aerospace and Mechanical Engineering students may be offered.

Prerequisite: Permission of the Department.

Engineering 87.481★

Spacecraft Design

Types of spacecraft and mission requirements. Overall systems design considerations: configuration control during design; planning and scheduling. Environmental considerations during launch and in orbit: thermal, effect of vacuum, debris impact. Design implementation: mechanical, thermal, and electrical/electronic aspects. Spacecraft testing: vibrational, acoustic, vacuum, and thermal testing. Component testing. Simulation.

Prerequisites: Engineering 91.241★ and 87.302★.

Not offered 1990-91.

Engineering 87.495★

Professional Practice Seminar

This course is intended to familiarize future professional engineers with current engineering practice and its relationship to other disciplines and to society in general. A sequence of seminars is presented by faculty and external lecturers covering topics such as the Professional Engineers Act, professional ethics, responsibilities of professional engineers and engineering practice appropriate to the discipline. Also included are seminars on the impact of technology on society. The development of communication skills, both oral and written, is emphasized.

Precludes additional credit for Engineering 82.495★, 88.495★, 94.495★ and 97.495★.

Prerequisite: Fourth-year registration.

Not offered 1990-91.

Engineering 87.470★

Engineering Materials

Materials (metallic and non-metallic) in engineering service, relationship of interatomic bonding, crystal structure and defect structure to material properties; polymers: thermoplastic, thermosetting, viscoelastic and viscoplastic behaviour; phase diagrams and alloys; microstructure control (heat treatment); composites, reinforcement, laws of mixtures; material failure: fracture, fatigue, creep and corrosion. Precludes additional credit for Engineering 88.270★ and 88.271★.

Prerequisite: Third- or Fourth-year registration in an Engineering program.

Text: Van Vlack, *Materials Science and Engineering*, Fifth Edition.

Not offered 1990-91.

Engineering 87.497

Aerospace Engineering Project

As part of the Fourth-year program, each student is required to participate in a major project in engineering analysis, design, development or research. One or more substantial projects, involving the design of an aerospace vehicle, device or structure, will be undertaken in the Department each year and students participate in this as design team members. The objective is to provide each student with an opportunity to exercise initiative, self-reliance, creative ability and engineering judgment while also developing an awareness of the problems of system integration and project management which typically arise in aerospace projects. Results are submitted in the form of design reports and a final summary report. Design teams will be organized on or before the last day of classes in

September.

Prerequisite: Fourth-year registration in B.Eng. (Aerospace) program.

Not offered 1990-91.

Department of Systems and Computer Engineering

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Mackenzie Building, Room 377
Telephone: 788-5740
Fax: 788-5727

Officers of Instruction

Chairman
S.A. Mahmoud

Professors
B.A. Bowen
R.J.A. Buhr
D.C. Coll
D.D. Falconer
A.R. Kaye
S.A. Mahmoud
L.R. Morris
B. Pagurek
J.S. Riordon
A.U.H. Sheikh
C.M. Woodside

Associate Professors
N.W. Dawes
M.S. El-Tanany
H.M. Hafez

Assistant Professors
J.W. Chinneck
R.A. Goubran
G.M. Karam
H.W. Lee
S. Majumdar
H.M. Schwartz

Adjunct Research Professors
S. Aly, *Bell-Northern Research*
M. Koocholi, *Bell-Northern Research*
J.-Y. Le Boudec, *Bell-Northern Research*
M. Niktash
R.D. Peacock, *Bell-Northern Research*
S. Rawat, *Bell Canada*

Sessional Lecturer
J. Johnston

Instructors
D.L. Bailey
W.A. Sullivan

Courses Offered

Engineering 94.202★

Advanced Programming Techniques

A course designed to provide in-depth experience in the design and construction of computer programs involving data structures. The language of instruction is PASCAL. The data structures, including stacks, queues, lists and trees, are presented from the viewpoint of abstract datatypes, object-oriented programming. Introduction to LISP or PROLOG and symbolic computations.

Prerequisite: Engineering 91.166★ and 91.167★ or equivalent.

Winter term: Lectures three hours a week, problem analysis two hours a week.

Engineering 94.260★

Systems and Simulation

Properties of linear systems. Linear dynamic models of engineering systems. Applications of the Laplace transform. Transfer functions. Block diagrams. Frequency and time response. Effects of feedback on system response. Fourier signal analysis. System simulation with analog and digital computers.

Prerequisite: Second-year registration.

Fall and Winter terms: Lectures and tutorials three hours a week, laboratory and problem analysis three hours a week.

Engineering 94.261★

Electrical Energy Conversion

Fundamentals of energy: electrical and magnetic energy, electromagnetic induction and forces. Synchronous machines: single and three-phase AC generation and transmission. Power transformers: ideal and practical. DC motors: equations, equivalent circuits, operating characteristics, starting and speed control. AC induction motors: torque-speed characteristics, equivalent circuit, single phase motors. Applications of power semiconductor devices: rectification and control.

Prerequisite: Engineering 91.251★.

Text: Elgerd, *Basic Electric Power Engineering*.

Winter term: Lectures three hours a week, laboratory and problem analysis three hours a week.

Engineering 94.301★/94.401★

Operating Systems

An introduction to operating system principles, concurrent programs, system nucleus, structure of kernel, memory management, resource allocation and scheduling, deadlock problems and reliability.

Precludes additional credit for Computer Science 95.300★.

Prerequisite: One of Engineering 94.303★ or Computer Science 95.203★ or equivalent experience.

Text: Silberschatz and Petersen, *Operating Systems Concepts* (Alternate Edition).

Engineering 94.301★, Fall term: Lectures three hours a week.

Engineering 94.401★, Winter term: Lectures three hours a week.

Engineering 94.303★

Real-Time Computing Systems

An introduction to the use of microcomputers as real-time, interactive systems, using 8088-based PCs as the primary example. Computer organization: register structure; representation of instructions, numbers and characters; addressing modes; instruction set. Programming techniques: assembly language coding, interfacing to high level languages, symbolic debugging. Input/output methods: polling, priority and vectored interrupts, direct memory access. Peripherals: keyboard, character and graphics displays, programmable timer, parallel and serial devices, A/D and D/A converters. Numeric coprocessors. Real-time systems: concurrency, software issues. Applications to digital signal processing and data communications. If time permits, other microprocessor families and RISC architectures will be examined.

Precludes additional credit for Computer Science 95.203★.

Prerequisites: Engineering 91.166★ and 91.167★, or equivalent.

Text: Runnion, *Structured Programming in Assembly Language for the IBM-PC*.

Both terms: Lectures and tutorials three hours a week, laboratory two hours a week.

Engineering 94.304★

File Structures and Data Bases

Introduction and definitions of databases and database management systems. File systems organizations: sequential, indexed-sequential, direct access and multiring files, hybrid organization, multiple key retrieval and inverted files. Database systems: data dictionary entity-relationship model; network model; relational model, relational algebra and calculus, normalization; hierarchical model. Hardware and its parameters, system performance evaluations: estimates of system usage, storage requirements and cost benefit comparison.

Precludes additional credit for Computer Science 95.305★.

Prerequisite: Engineering 94.202★ or 94.303★ (may be taken concurrently) or Computer Science 95.202★.

References: Hawryszkiewicz, *Database Analysis and Design*; Martin, *Computer Data-Base Organization*.

Fall term: Lectures three hours a week.

Engineering 94.310★

Systems Analysis

Introduction to the concepts and techniques of analysis of complex problems: converting an ill-defined problem into a blueprint for a solution. The course covers applications in computer-based information systems, but the techniques are of wider applicability. Students work in teams to develop their skills on case studies. Topics include: the software lifecycle, data flow diagrams, data dictionaries, process representation, data structure diagrams, program structure charts, analysis of alternative solutions.

Prerequisites: Engineering 91.166★ and 91.167★ or equivalent.

Text: Teague and Pidgeon, *Structured Analysis Methods for Computer Information Systems*.

Fall term: Lectures three hours a week.

Engineering 94.320★

Industrial Engineering

This course introduces techniques of operations research used for decision-making in complex engineering systems. Topics include linear programming, network models, PERT, integer programming, dynamic programming, queueing systems and inventory theory. Problem-solving is emphasized.

Precludes additional credit for Mathematics 69.381★, Economics 43.404★, or Business 42.230★.

Prerequisite: Engineering 91.266★.

Text: Winston, *Operations Research: Applications and Algorithms*.

Winter term: Lectures three hours a week.

Engineering 94.333★

Advanced Real-Time Programming

Principles and practice of concurrent programming for real-time environments. Processes; inter-process communications using procedure-oriented and message-oriented mechanisms; characteristics of the real-time environment; process interaction with hardware using interrupt service routines and device drivers; structural system design for real-time applications; language issues; hardware/software tradeoffs. Emphasis is placed on mini-micro applications in areas such as intelligent terminals and computer networks.

Prerequisites: Engineering 94.303★ and 94.202★.

Winter term: Lectures two hours a week, laboratory three hours a week.

Engineering 94.351★

Communication Theory

Representation of signals; review of Fourier series; Fourier transforms; frequency and time domain representation of signals; representation of signals by transmission of

samples; signals through channels; convolution, distortion, power and energy spectra; random variables and processes, description of noise, auto correlation; noise in communication networks; noise bandwidth; noise figure. Analog modulation: amplitude modulation and demodulation; DSB, SSB and VSB. Exponential modulation; FM/PM spectra, modulators and demodulators, PLL. Noise performance of AM, FM systems. Application of analog modulation systems.

Prerequisites: Engineering 94.260★ and Mathematics 69.375★.

Text: Carlson, *Communication Systems: An Introduction to Signals and Noise in Electrical Communications*, Third Edition.

Reference: Lathi, *Communication Systems*.

Winter term: Lectures three hours a week, laboratory three hours, alternate weeks.

Engineering 94.361★/94.461★

Microprocessor Systems

The course deals with the various interfacing aspects in microprocessor systems. It starts with an overview of existing microprocessors and bus structures, followed by a detailed study of the internal architecture, the instruction set, and the pin functions of a specific microprocessor. Then, it addresses memory interfacing and input-output subsystems. Interrupt structures, direct memory access, input/output processors, and multiprocessor systems are discussed.

Precludes additional credit for Computer Science 95.306★.

Prerequisites: Engineering 94.367★ and 94.303★ or permission of the Department.

Text: Slater, *Microprocessor-Based Design*.

Engineering 94.461★, Fall term: Lectures three hours a week, laboratory three hours alternate weeks.

Engineering 94.361★, Winter term: Lectures three hours a week, laboratory three hours alternate weeks.

Engineering 94.362★

Electric Power Circuits and Machines

Single phase and three phase A.C. circuits: phasors, voltage, current, and power calculations, flicker, power factor correction, asymmetry, star and delta configurations. Power measurement and rate structures. Single phase transformer: construction, theory of operation and equivalent circuit, OC/SC tests, three phase connections, name plate data and specifications. Three phase induction motor and synchronous motor: construction, theory of operation and equivalent circuits, calculations, starting. Discussion of single phase motors.

Prerequisite: Engineering 94.261★.

Text: Printed lecture notes.

Not offered 1990-91.

Engineering 94.367★

Switching Circuits

Boolean algebra, gates, combinatorial circuits, canonical forms. Binary arithmetic, two's complement notation, multiplication and division. Arithmetic logic units, programmable logic arrays, read-only memories. Introduction to synchronous sequential circuits, finite state machines, state minimization. MSI registers, counters, finite state machine realization using MSI. Introduction to asynchronous sequential networks, flow tables, state assignment, realization.

Prerequisite: Engineering 91.251★ or permission of the Department.

Text: Roth, *Fundamentals of Logic Design*.

Fall term: Lectures three hours a week, laboratory three hours alternate weeks.

Engineering 94.405★**Discrete Simulation and Its Applications**

Simulation as a problem-solving tool. Random variate generation, general discrete simulation procedure: event table and statistical gathering. Analyses of simulation data: point and interval estimation. Confidence intervals. Network modelling, simulation and problem solving using SLAM. Other simulation languages.

Prerequisite: Fourth-year registration or permission of the Department.

Text: Pritsker, *Introduction to Simulation and SLAMII*.

Winter term: Lectures three hours a week, problem analysis one hour a week.

Engineering 94.415★**Engineering Management**

An introductory and overview course on modern management concepts; material is presented through lectures, seminars and case studies. Historical review. Basic elements, tasks, functions and activities of the management process including planning, organizing, staffing, directing and controlling. Dilemmas and constraints. Management style. Guest lecture on collective bargaining, on the psychology of management, etc. On completing the course the student should be able to: read and constructively criticize management literature; discuss "management" with experts in a rational manner; appreciate the management basis of the first engineering work situation.

Prerequisite: Fourth-year registration.

Evening division, Fall term: Lectures two hours a week, seminars three hours alternate weeks.

Engineering 94.445★**Discrete Time Systems**

Discrete time signal and system representation: time domain, z-transform, frequency domain. Sampling theorem. Digital filters: design, response, implementation, computer-aided design. Spectral analysis: the discrete Fourier transform and the FFT. Applications of digital signal processing.

Prerequisite: Engineering 94.260★

Winter term: Lectures two hours a week, laboratory three hours alternate weeks.

Engineering 94.455★**Automatic Control Systems I**

Review of Laplace transform techniques. Effects of feedback: frequency response, pole-zero positions. Compensation: root locus, Bode plots. State variables: formulation, solution of linear systems, examples of simple second-order non-linear systems. Discrete time systems: z transforms. Signal reconstruction.

Prerequisites: Mathematics 69.201 and Engineering 94.260★.

Text: Hostetter, Savant and Stefani, *Design of Feedback Control Systems*.

Fall term: Lectures and tutorials three hours a week, laboratory three hours alternate weeks.

Engineering 94.457★**Introduction to the Architecture of Computer Systems**

A comprehensive historical review of computing machines from Pascal and Babbage to present-day architectures, emphasis on evolution of concepts, the influence of technology and the techniques evolved to increase performance. A structured view of methodologies (for gate, register and processor design) with particular stress on their limitations. Detailed analysis and design for controllers, processors and memory systems, using existing machines as examples. A range of such component implementations is extended for enhanced performance leading to discus-

sions of super computers. Computer classification schemes are examined. A discussion of systems of computers and related problems.

Prerequisite: Engineering 94.367★.

Text: Hayes, *Computer Architecture and Organization*.

Fall term: Lectures three hours a week.

Engineering 94.460★**Digital Communications**

Review of probability and random variables and signal representation. Pulse code modulation and other digital waveform coding techniques. Physical layer of data communications. Baseband data transmission: Nyquist criterion, filtering, optimal receiver, probability of error. Digital modulation techniques and their performance. Synchronization. Introduction to information theory. Error detection and correction techniques. Examples of techniques employed in various digital communications systems.

Prerequisite: Engineering 94.351★.

Text: Taub and Schilling, *Principles of Communication Systems*.

Fall term: Lectures three hours a week, laboratory three hours alternate weeks.

Engineering 94.462★**Introduction to Computer Communications**

Data communications: character sets, electrical interfaces, asynchronous and synchronous transmission, data-link protocol, terminal networks, time division and statistical multiplexing. Computer-communications: introduction to OSI; circuit and packet switching; X.25; review of local-area networks: token-passing, CSMA/CD, FDDI; ISDN.

Prerequisite: Fourth-year registration.

Text: Halsall, *Data Communications, Computer Networks and OSI*.

Winter term: Lectures three hours a week; laboratory three hours alternate weeks.

Engineering 94.470★**Telecommunications Engineering**

A broad spectrum of topics related to the state of the art in telecommunications is presented. Topics include: telecommunications as a national and international infrastructure; network architecture from a systems viewpoint including transmission, switching, signalling, and teletraffic; integrated services digital networks (ISDNs), (voice, data, video, etc.); network planning, role of economic studies; network management and control operations; global telecommunications including the International Telecommunications Union; the telecommunications industry (R & D, manufacturing, operations); standards-setting and the role of government, regulation and competition. The course concludes with an overview of telecommunications as a viable business enterprise, the importance of the human factor in its operations, and current issues likely to affect the future development of telecommunications at home and abroad.

Text: Houghton, *The Telecommunications Mosaic*.

Prerequisites: Engineering 94.351★, 94.451★ or the equivalent.

Engineering 94.480★**Software Engineering**

This course is concerned with technical issues and methodologies for specifying and designing systems that may be implemented as sets of software and/or hardware modules. Decomposition of systems into modules; formal definition of modules as packages; systems as sets of packages with formally defined interfaces; graphical tools for specifying and manipulating system designs; data-flow-driven design; concurrency and real time; principles of

testing, verification and reliability; case studies of significant programs and design examples; assignments involve both critical evaluation of given designs or programs and independent development of new designs to satisfy given requirements.

Prerequisites: Engineering 94.202★ and 94.333★ or the equivalent.

Text: Pressman, *Software Engineering*.

Fall term: Lectures three hours a week, laboratory three hours alternate weeks.

Engineering 94.481★

Software Engineering Project

Students participate in a team project to develop a small piece of stand-alone software in an organized and structured fashion. Non-numeric applications are emphasized. All phases of the project are considered equally important: specification, design, implementation, testing and documentation.

Prerequisite: Engineering 94.480★ or concurrent registration.

Winter term: Tutorial three hours a week.

Engineering 94.485★

Computer Systems Design Laboratory

Development of professional-level design and development expertise: converting requirements into successful real-time computing systems involving components of both software and hardware. Examples are drawn from areas such as intelligent terminals, computer networks, real-time control and signal processing systems.

Prerequisites: Engineering 94.333★, 94.361★/94.461★ and 94.480★, registration in Fourth-year Computer Systems Engineering.

Winter term: Lectures two hours a week, laboratory four hours a week.

Engineering 94.495★

Professional Practice Seminar

This course is intended to familiarize future professional engineers with current engineering practice and its relationship to other disciplines and to society in general. A sequence of seminars is presented by faculty and external lecturers covering topics such as the Professional Engineers Act, professional ethics, responsibilities of professional engineers and engineering practice appropriate to the discipline. Also included are seminars on the impact of technology on society. The development of communication skills, both oral and written, is emphasized. (Also listed as Engineering 97.495★).

Precludes additional credit for Engineering 82.495★, 87.495★ and 88.495★.

Prerequisite: Fourth-year registration.

Winter term. Seminar three hours a week.

Engineering 94/97.496★

Special Topics In Electrical and Computer Systems Engineering

At the discretion of the Faculty, a course dealing with selected advance topics of interest to Electrical and Computer Systems engineering students may be offered.

Prerequisite: Permission of the Department.

Engineering 94.497 or 94.498

Engineering Project

As part of the Fourth-year program, each student is required to select and complete a major project in engineering analysis, design, development or research. The objective is to provide an opportunity to develop initiative, self-reliance, creative ability, and engineering judgment. The results must be submitted in a comprehensive report with

appropriate drawings, charts, bibliography, etc. Each student is required to submit his or her engineering project proposal to the Chairman of the Department of Systems and Computer Engineering on or before the last day of classes in September.

Note:

Students in the Electrical Engineering degree program whose engineering project is under the supervision of a faculty member within the Department of Electronics should register in Engineering 97.497; those whose project is under the supervision of a faculty member in the Department of Systems and Computer Engineering should register in Engineering 94.497.

Students in the Computer Systems Engineering degree program whose engineering project is under the supervision of a faculty member within the Department of Electronics should register in Engineering 97.498; those whose project is under the supervision of a faculty member in the Department of Systems and Computer Engineering should register in Engineering 94.498.

Architecture Building, Room 202
Telephone: 788-2855

Officers of the School

Director
G. F. Sutton

Director, Architectural Research Group
G.F. Sutton

Professors
R.G. Brand
J. Flanders
S.G. Haider
S. Loten
D. Moizer
R.E. Osler
H. Sharon

Associate Professors
K.S. Andonian
F. Carter
C.C. Gordon
N. Griffiths
H. Honegger
E. Kayari
G.D. Milne
P. Sharp
G.F. Sutton
D. Westwood

Assistant Professors
B. Bell
T. Boddy
M. Bressani
T. Dubicanac
B. Webster

Visiting Assistant Professor
B. Gianni

Instructors
J. Molder
C. Robinson

Adjunct Professor
J. Strutt

Adjunct Research Professors
J. Dalibard
G. MacDonald
B. Padolsky
A. Rankin
J. Smith

Sessional Lecturers
R. Botros
Y. Cazabon
J. Cook
W. Dawson
M. Fisher
R. Mallett
S. McKenna
T. Wolstenholme

Visiting Studio Critics
M. Priest
B. Shim
J. Schnier

Photographic Supervisor/Instructor
D. Lepage

Bachelor of Architecture Degree Program

The Bachelor of Architecture degree is awarded on the successful completion of a five-year program of studies. Candidates should note that due to the intensity of the program, students often choose to take more than five years to complete their degree. The curriculum at Carleton is expected to provide the student with the theoretical, technical and formal knowledge and skill necessary for creative and responsible intervention in the built environment. In order to generate a symbolic order through plastic form, the architect should be endowed with a range of sensibilities that emerge as synthetic vision in the design studio. The program has two components relating to this: a core, which is mandatory and provides the essential knowledge and experience; and a series of elective course choices becoming more extensive in the upper years, allowing students to develop their own areas of architectural interest.

The degree is recognized by The Canadian Architectural Certification Board as a prerequisite to apply for certification of academic qualifications for registration to practise as an architect in provincial associations, subject to assessment of each applicant's academic record by the board. Information concerning mandatory work experience and other requirements for registration may be obtained from the professional associations of Canada and the Commonwealth.

The resources of the Ottawa area, including those of Carleton University, are unique in their concentration of specialized personnel, laboratories, libraries and other facilities. They provide the opportunity and capability for a wide range of multidisciplinary academic and research programs in such fields of architecture as housing, urban studies, industrialized building and history and theory of architecture.

Combined B.A. (Pass) and B.A. (Honours) Degree in Art History and Architecture

The School of Architecture co-operates with the Department of Art History in offering Combined B.A. (Pass) and B.A. (Honours) degrees in Art History and Architecture. (For details see p. 70.)

Academic Clubs and Societies

SAAS, School of Architecture Association of Students, organizes special events several times a year, and is a focus for student discussion.

Forum Lecture Series: The School of Architecture plans and organizes a series of public lectures on contemporary issues in architecture and related fields.

Regulations

The following regulations apply to all students enrolled in the School. Students are urged to seek the advice of their instructors on all questions about the regulations, and in particular before taking any action affecting promotion and probation, withdrawal, transfer of credit, appeals and review of grades.

Student Responsibility

The student is responsible for knowing the regulations of the School of Architecture and for complying with them. Any exceptions to the regulations must be approved in writing by the School of Architecture Committee on Standing, Promotion and Awards. Routine approval of a records form (for example, a registration contract or course change form) does not constitute approval of an exception.

Timetables

Courses in the School of Architecture are offered in the Day or Evening division, and are scheduled in the timetables of the University.

Exceptions to the Regulations

Regulations may be waived for academic, medical or compassionate reasons. The School of Architecture Committee on Standing, Promotion and Awards is responsible to the Curriculum/Management Committee and to Faculty Board for considering students' requests for special consideration regarding the regulations. Requests should be made in writing to the Chair of that committee.

Admission and Readmission Requirements

First Year

To be eligible for admission to the First year of the program of studies leading to the Bachelor of Architecture degree, the applicant must have passed the Qualifying-University-year examinations at Carleton University in five credits with a minimum grade-point average of 4.0 and a grade of C- or better in Mathematics and in Physics; or the Ontario Secondary School Diploma or the equivalent with six Ontario Academic Courses (OACs), including Calculus, Algebra and Geometry, and Physics, with a minimum average of 65 percent.

Refer to the section on Admissions in the general regulations of the Calendar for additional admissions information (pp. 24-30).

Selective Admission

It should be noted that the number of student spaces in the School is limited. Because of this, it may not be possible to grant admission to all applicants who meet the foregoing requirements. Admission will therefore be on a selective basis with preference given to those candidates who show the highest promise of success in the program through a portfolio of creative work, and academic grades. Members of the Admissions Committee of the School of Architecture are available by appointment during the academic year to answer enquiries regarding the School's program.

Advanced Standing

Applications for admission with advanced standing to the Second or subsequent years of the program leading to the Bachelor of Architecture degree will be evaluated on an individual basis. Advanced standing for academic subjects completed at another university or college may be accepted if the subject is recognized as the equivalent of a corresponding subject offered at Carleton, or for a subject particularly appropriate to a degree in architecture. Advanced standing may be recognized at any time in the program.

Readmission

Students who have been absent from the University for two consecutive Fall/Winter sessions and the intervening Summer session (except students holding a Letter of Permission from the Carleton School of Architecture) are required to apply for readmission before registration.

Former students who have forfeited their undergraduate status must request readmission by writing to the Director of the school and the request must be accompanied by an updated portfolio of work. The decision whether or not to readmit will be made by the Faculty Board.

Applications for readmission (obtainable from the Office of Admissions and Academic Records) must be filed before May 1 for the Fall/Winter session.

Proficiency in English

Since the instructional language of the University is English, applicants must be able to understand and be understood in English, both written and oral. Applicants whose mother tongue is other than English must clearly exhibit this ability. See p. 24.

Registration

Registration

In order to facilitate more effective academic planning for the following school year, students must declare their intention to continue in the program by July 1.

Students who have been absent from the University for one full Fall/Winter session (September through April) should notify the School by July 1 of their intention to register for the following Fall/Winter session.

Students are to complete their course registration by the registration periods shown for the session or term in the schedule for the Academic Year on pp. 8-9.

Late Registration

Registration after the registration period incurs a late registration fee. Registration is not permitted after the late registration period.

Course Credit Value

Credit values are indicated against course descriptions. Courses marked ★ are half credit courses, indicated 0.5 on record documents.

Course Load

The program in the School of Architecture is based on a course load of six full-credit equivalents for five years.

Student Records

Incorrect address information will delay the receipt of awards, examination results and changes in academic status. Students must notify the School and the Divisional Registrar's Office immediately of any change in permanent address.

Promotion and Continuation

Standing In Courses

Standing in courses will be determined by the School of Architecture. Standing in courses will be shown by alphabetical grades. The system of grades used, with corresponding grade points, is as follows. Supplemental examinations for courses are graded by the same scale.

A+	12	B+	9
A	11	B	8
A-	10	B-	7
C+	6	D+	3
C	5	D	2
C-	4	D-	1

The following percentage equivalents are published solely to assist other institutions in interpreting letter grades. Students are advised that these equivalents have no internal application.

A+	90- 100	B+	77-79
A	85- 89	B	73-76
A-	80- 84	B-	70-72
C+	67- 69	D+	57-59
C	63- 66	D	53-56
C-	60- 62	D-	50-52

Other notations are as follows:

Aeg

Pass standing granted under special circumstances. Aegrotat standing is granted only by a faculty committee, in response to a student's application. (See Deferred Final Examinations, p. 39.)

Aud

Indicates course is not being taken for academic credit.

F

Failure. No academic credit.

FNS

Failure without access to supplementals because of incomplete term work or unacceptably low standing. No academic credit.

Abs

Absent from final examination. No supplementals. No academic credit. Abs is usually equated to failure.

Wdn

Withdrawn in good standing. No academic credit.

Def

Indicates deferral of final grade has been approved by a faculty committee. (See Deferred Final Examinations, p. 39.)

Ch

Credit granted under Challenge for Credit policy.

Computation of Averages

The 12-grade-point system is set out above. The grade points earned in any specific course are determined by multiplying the grade points corresponding to the grade by the credit value of the course. Thus an A+ in a half-credit course will earn the student six grade points, while A+ in a two-credit course would be worth 24 grade points.

Grade-point averages are calculated by dividing the total accumulated grade points by the total credits.

Promotion

Students who achieve a passing grade in all courses and have the necessary grade-point averages will be promoted to the next year of the program. In arriving at the grade-point average, only the grades of the courses required to make up a full program in that year will be averaged.

Design Studio Courses (First to Fourth Years)

In each design studio course, a minimum grade of C- is required for the student to be eligible for promotion. A student with a grade-point average below 3.5 will not be eligible for promotion and the student will be placed on probation. Students who, during one year of the program, achieve a passing mark in one term and a D+, D, or D- in the other, and whose grade-point average in studio is at least 3.5 will have their studio portfolio reviewed by the faculty members teaching in that year (in consultation with the studio co-ordinator of the following year). In these cases, a discretionary decision will be made to promote or to prescribe further study before promotion. The student will be informed of this decision by the faculty members involved, in order to ensure that the student understands the deficiencies in his or her work and the suggestions that have been made to overcome them.

All Other Courses

In the combined courses without design studio, a grade-point average of 3.5 or better is required, to be promoted to the next year of the program.

Design Studio Course Sequence

During the first four years of the program, the Fall-term course must be taken before the Winter-term course.

Deficiencies and Probation

A student who in one program year has failed a course or courses valued at more than 1.0 credit or whose grade-point average in studio or non-studio courses is below 3.5 (after any supplemental examinations), will be considered to have failed the year and, if given permission to return, will return as a student on probation.

Students who are not on probation but who have up to 1.0 credit deficiency may proceed to the next higher year, except to Fifth year. Students with more than 1.0 credit deficiency are not permitted to register in core courses of the higher year.

Students without clear standing will not be permitted to register in the Fifth-year core courses.

Core course deficiencies may only be carried into the next higher year. If these deficiencies are not cleared, students may not take core courses in the succeeding year.

A student on probation may not register for core courses in any higher year, but every effort will be made, on an individual basis, to help students develop their potential during the probation period.

In order to return to regular status, students on probation must repeat each failed course and any other course in that year where their grade was less than C-, except for electives, where a substitute course may be taken. Students may register in a course only once for the purpose of clearing probation, and must achieve a grade of C- or better. *If the required grade is not achieved, the student will forfeit undergraduate status.*

A student who has cleared probation in the past, but whose grades in a subsequent year would lead to a second probation will forfeit undergraduate status.

A student who has forfeited undergraduate status must spend one academic year away from school before applying for readmission.

Examinations

General regulations on examinations are on p. 39.

Supplemental Examination Privileges

A student may not write a supplemental examination in a course graded *FNS* or *Abs*. If a supplemental examination is failed, the student must repeat the course before writing another examination in it. Supplemental examinations must be written at the next supplemental examination period. Supplemental examinations are not offered in design studio.

Application to write supplemental examinations must be made at the appropriate Divisional Registrar's Office. Application must be made by the designated date (see Examination Charges, p. 44).

Grade-Raising Examinations

Students may, on application, write grade-raising examinations in courses already passed, and in which supplemental examinations are offered. Grade-raising examinations may be available in other courses with the approval of Faculty Board.

The grade awarded subsequent to a grade-raising examination supersedes the original final grade. A grade-raising examination in a course can be written only once and at the next scheduled examination period.

Only one grade-raising examination in the Fifth-year program (in either the self-initiated project, or design, or research thesis) will be permitted, with a maximum grade obtainable of C-.

Review of Grades

Students are entitled to a review of a final grade. Those wishing to receive such a review should enquire at the appropriate Divisional Registrar's Office, after which they may wish to make a formal application for this review. Applications must be filed with the appropriate Divisional Registrar's Office within 14 days of the official release of grades for the term.

Requests for review are dealt with by the Director in consultation with the appropriate faculty member(s).

Evaluation

To gain standing in a course, a student must meet the course requirements for attendance, term work and examinations.

Instructors will inform their classes in writing before the last date for course change of the elements that will contribute to the final grade and their weighting, including attendance, class participation, essays, tests and final examinations. Also stated will be the availability of supplemental and grade-raising examinations, and the method of computing a grade revised by these examinations.

Retention of Work

Keeping a good portfolio is a most important part of architectural education. A portfolio represents a record of the student's progress and design experience over the years. It is an indispensable requirement for any job application in the future. A portfolio is started in First year and continues to expand until graduation. The School, therefore, requires that each student produce reductions (normally 8 1/2 X 11 inch reproductions, colour or black and white and/or slides) of their work at the end of each term. One copy of the work should be put in the student's portfolio and the other turned in to the instructor for retention in the School's archives. (This facilitates retrospective exhibitions of work, accreditation, publications and any future references for pedagogic purposes.) Original work is the property of the students, but the School retains the right to keep work of merit for up to two years after the date of submission. The School will make every effort to preserve the work in good condition, and will give authorship credit and take care of its proper use.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39). To meet Section 1 of the regulations, a student must have had clear standing to Fifth year and have passed an approved pattern of courses in Fifth year with grades of C- or better in each of the Studio and Thesis courses taken and a grade-point average in the other courses of 3.5 or better.

Application to Graduate

Students expecting to graduate in the Spring must make application on the form available in the Divisional Registrar's Office by February 1; those expecting to graduate in the Fall by September 1; and those expecting to graduate in February, by December 1.

Degrees with Distinction

Upon recommendation of the School of Architecture, the notation "with High Distinction" may be made on the academic records of a candidate for the degree of Bachelor of Architecture. To be considered for this recommendation, the candidate is expected to obtain a grade-point average of at least 10.0 in the course requirements of final year. In addition, the student must obtain a grade-point average of at least 7.8 in the design studio courses of the First to Fourth years inclusive, and at least 7.8 in the other course requirements of the First to Fourth years inclusive.

Upon recommendation of the School of Architecture, the notation "with Distinction" may be made on the academic records of a candidate for the degree of Bachelor of Architecture. To be considered for this recommendation, the candidate is expected to obtain a grade-point average of at least 8.0 in the course requirements of final year. In addition, the student must obtain a grade-point average of at least 6.6 in the design studio courses of the First to Fourth years inclusive, and at least 6.6 in the other course requirements of the First to Fourth years inclusive.

For transfer students, degrees "with Distinction" and "with High Distinction" will be awarded at the discretion of the Faculty Board.

Scholarships and Awards

The faculty of the School will recommend students to the Senate for scholarships and awards available to the School. For this purpose an overall grade-point average including the design studio courses will be calculated. The design studio grade, the course grade-point average or the overall grade-point average will be used as is most appropriate for the nature of the award.

Special prizes are also given to acknowledge distinguished work.

Students admitted with advanced standing whose grade-point average may not represent a true measure of their worth will be given individual consideration.

See Awards and Financial Assistance, p. 16.

Course Requirements

Core Courses

1. Design Studios

(a) The heart of the architectural program is the design studio. Design projects are the primary learning vehicle, supported by lectures, seminars and tutorials.

Design studio courses are for 1.5 credits a term in the first four years. In Fifth year, design studio or research thesis is 1.5 or 2.5 credits per term in accordance with the notes on the chart on p. 326. Design studio courses are taught by lectures, seminars and individual tutorial instruction. The design studio courses tend to require more individual work than might be indicated by the scheduled contact time. Enrolment is restricted to students admitted to the Architecture program.

(b) As a special option, the program normally offers Visiting Critic Studios, to provide a limited number of students in Fourth and Fifth years with an opportunity to work with a distinguished teacher or architect. The visiting critic presents the design problem and works closely with a faculty member who co-ordinates the studio. Students will normally be allowed a maximum of one term in a Visiting Critic Studio.

2. Core Courses

Core courses are the mandatory part of the program, providing the required academic and professional foundation for studies in architecture. While more extensive in the lower years, they extend across the entire program and are as designated in the course charts, pp. 324-326 and in the description of courses offered, pp. 326-332. Enrolment in

core courses may be limited by constraints of space and other resources. When necessary, preference will be given to students registering in the Architecture program and the Architecture/Art History combined program.

Note:

Prerequisites to core courses may not be waived except on appeal to the Committee on Standing, Promotion and Awards and with special permission of the Faculty Board.

3. Theories Electives

This is a selection of courses that broadly sets out a theoretical context for architecture. Theories electives are selected from the following courses:

Architecture

- 76.302★ History of Canadian Architecture
- 76.307★ History of Architectural Theory
- 76.308★ Origins of Modern Architecture
- 76.309★ History and Theory of the Avant-Garde
- 76.315★ Theories of Landscape Design
- 76.318★ Design of Cities
- 76.319★ Theory of City Form
- 76.391★ Selected Topics: Studies in Theory and History of Architecture
- 76.408★ Modernism in Architecture
- 76.440★ Directed Studies Abroad: Theory

Art History

- 11.286★ Art and Ideas: From Ancient Greece to the Twentieth Century
- 11.287★ Art and Ideas: The Twentieth Century
- 11.305★ American Architecture
- 11.327★ Gothic Architecture and Monumental Sculpture
- 11.350★ British Art and Architecture: 1600-1850

Classics

- 13.235 Ancient Science and Technology

Theories electives may also include other courses in the field that become available and are approved by the Faculty Board.

Students must pass one and a half credits in theories electives before enrolling in Fifth year. Students are free to choose in what terms they take the courses. Additional theories electives may be taken as approved electives by Third, Fourth and Fifth-year students. First and Second year students enrolled in the Architecture program may not register in theories electives.

Elective Courses

1. Workshop Courses

Workshop courses are scheduled for one term at six hours a week of seminar and/or individual work, including tutoring, and receive a half credit. Workshop enrolments are limited.

2. Approved Electives

A list of approved elective courses offered by the School and by other departments of the University will be published at registration.

Course Program

The program of study is outlined in the following charts and detailed course descriptions appear on pp. 326-332, and listed under "Courses and Workshops Offered."

All programs are subject to change according to the final availability of resources at the time of registration.

Fourth-Year Directed Studies Abroad

When circumstances allow, a Studies Abroad option is available to students who are enrolled in the Fall term of the Fourth year of the program. This study takes place in a location away from Ottawa and usually outside Canada. The location is selected for its architectural and urban relevance to the state of the art, and is carried out under the direction of a faculty member of the school. The study option is available to students with clear standing to the Fourth year of the program.

Fifth Year

Students without clear standing will not be permitted to register in Fifth-year core courses.

Before the end of the Fourth year of the program, students will enter into discussions with faculty members regarding their Fifth-year courses.

Independent Study

A student enrolled in the Bachelor of Architecture program may propose, and may be permitted to undertake an independent study in lieu of approved elective or workshop elective course for one-half credit in each of Third, Fourth and Fifth years.

The purpose of this provision is to allow more flexibility for students to pursue a line of investigation in their own way, free of normal constraints of timetable and University locale. The independent study at the undergraduate level is to make no demands on University faculty other than those required for approval and evaluation.

In certain cases, with the approval of the department in which they are registered, students enrolled in another program at the University may be permitted to enrol in an independent study course under the direction of a member of the faculty of the School. The procedures and conditions will be detailed and approved jointly by the student, the department and the assessor in the school.

Serious scholarship and research are expected and proper documentation will be required. In the case of students in Architecture, registration for the study will be subject to the following conditions:

1. The student must not be on probation and must have no deficiencies in core courses from an earlier year.

2. The student will register for an independent study course in the term or session during which the work is to be completed. The student must submit the proposal in writing to the assessor prior to registration, outlining the objectives and direction of the study, the time and locale, resources available, submission date and other pertinent information.

3. The student must have obtained the prior agreement of a member of the teaching staff to act as assessor for the study. The student must also obtain the Director's approval of the proposal prior to registering in the course. The staff member will be responsible for evaluation. The student's assessor will deliver the completed and approved proposal to the Records Office of the School of Architecture to be filed with the student's course records.

General Information

Materials, Supplies and Field Trips

The program in Architecture, particularly the design studio courses, requires that the student produce large quantities of drawings and models, as well as ozalid prints and photostats, and requires use of other photographic media, reproductions of drawings, reports, etc., all of which can be costly.

Equipment for drawing, photography, etc., should be regarded as an investment, because good tools are essential and last a long time if properly cared for. An equipment list is provided as a guide to the entering student. A good quality 35mm. camera is a very useful but not mandatory item on the list and most students find they use it to such an extent that they wish to purchase one during the first year or two of the program.

Field trips to other cities are a part of the program. The School usually absorbs part of the cost of transportation but students are expected to meet most other expenses while away.

Experience indicates that the student should budget about \$1,500 for materials, equipment and field trips per year, not including a camera.

First Year	Fall Term	Winter Term
76.120★ Introduction to Architectural History	76.121★ Introduction to Western Architecture	
77.113★ Structures in Architecture	77.130★ Building Construction 1	
79.111★ Computer Craft	76.105★ Architectural Thought and Contemporary Society	
80.111 Design Studio 1A	80.112 Design Studio 1B	

Note:

1. Architecture 80.111 and 80.112 each have a course value of 1.5 credits.

Second Year**Fall Term****Winter Term**

76.203★ The Fundamentals of Architectural Vocabulary
 77.205★ Environmental Controls 1
 77.213★ Structural Analysis in Architecture

76.204★ The Physical Morphology of the City
 77.230★ Building Construction 2
 1 Approved Elective★

80.211 Design Studio 2A

80.212 Design Studio 2B

Notes:

1. Architecture 80.211 and 80.212 each have a course value of 1.5 credits.

2. It is recommended that the Second-year elective be chosen from courses offered by other departments of the University. However, a list of courses offered by the School and designated as suitable for this purpose will also be available.

3. Because of changes in the timing and numbers of Mathematics in Architecture and Computer Craft (formerly Algorithmic Problem Solving) courses, students who started their Architecture program before 1988 may find an apparent year sequence that misses one or both of them. All students must pass both courses or approved substitutes before they will be promoted to the Fourth year of the program.

Third Year**Fall Term****Winter Term**

77.313★ Structural Design in Architecture
 1 Theories Elective★ or 1 Approved Elective★
 1 Workshop Elective★

77.305★ Environmental Controls 2
 1 Theories Elective★ or 1 Approved Elective★
 1 Workshop Elective★

80.304 Design Studio 3A

80.306 Design Studio 3B

Notes:

1. Architecture 80.304 and 80.306 each have a course value of 1.5 credits.

2. Students must take at least 0.5 credits of theories electives before the end of the Third year.

Fourth Year**Fall Term****Winter Term**

2 Theories and/or Approved Electives
 (1.0 credit total)
 1 Workshop Elective★

76.452★ Architectural Research and Criticism
 1 Theories Elective★ or 1 Approved Elective★
 1 Workshop Elective★

80.403 Design Studio 4A

80.405 Design Studio 4B

Notes:

1. Architecture 80.403 and 80.405 each have a course value of 1.5 credits.

2. 3.0 credits of electives, of which 1.5 are to be theories electives, must be passed before the student enters Fifth year.

Fifth Year	Fall Term	Winter Term
77.350★ Design Economics	78.320★ Professional Practice	
One of: 80.440 Studio 5A and 1.0 credit Approved Elective or 0.5 credit Approved Elective and 0.5 credit Elective Workshop 80.460 Research Thesis 1 80.466 Design Thesis 1 80.470 Selected Topics Studio	One of: 80.458 Studio 5B: Student Initiated Projects 80.461 Research Thesis 2 80.467 Design Thesis 2	

Notes:
1. Architecture 80.440 has a course value of 1.5 credits
Architecture 80.458, 80.460, 80.461, 80.466, 80.467, 80.470 each have a course value of 2.5 credits.

2. Students who have already taken Architecture 77.350 will take an approved elective as a substitute.

Course and Workshops Offered

Architecture 76.105★ Core Course
Architectural Thought and Contemporary Society
Through the medium of lectures and seminars, the relationship between architecture, architectural thought and the architectural profession to the society in which they exist (and which they must serve) are examined. The topics considered in any year are selected to emphasize key issues.
Day division, Winter term: Lectures and seminars, three hours a week.

Architecture 76.120★ Core Course
Introduction to Architectural History
An introductory survey of major world traditions in architecture, concentrating on the organizing principles and formal properties of buildings. The course covers ancient and medieval architecture in Europe, Asia and America.
Day division, Fall term: Lectures three hours a week.

Architecture 76.121★ Core Course
Introduction to Western Architecture
A continuation of Architecture 76.120★ with the same emphasis, examining European and American architecture from renaissance to modern.
Day division, Winter term: Lectures three hours a week.

Architecture 76.203★ Core Course
The Fundamentals of Architectural Vocabulary
An exploration of architecture as the embodiment of ideas, language and meaning. Ideas are considered in relation to broad conceptual frameworks contrasting various theoretical approaches. Language is examined in terms of the elements, relationships, and ordering ideas within architecture. Consideration of the process of experiencing architecture and the levels of meaning in architecture complete the content undertaken in this course.
Day division, Fall term: Lectures three hours a week.

Architecture 76.204★ Core Course
The Physical Morphology of the City
A historical and theoretical description and comparative analysis of the physical morphology of cities. The primary structural, spatial and formal organization and elements that characterize the morphology of cities are studied in terms of their historical and contemporary significance for architecture and urban design.
Day division, Winter term: Lectures three hours a week.

Architecture 76.206★ Elective Course
Introduction to Industrial Design
Offered in the School of Industrial Design as Industrial Design 85.100★.

Architecture 76.211★ Elective Course
Industrial Design Analysis
Offered in the School of Industrial Design as Industrial Design 85.101★.
Prerequisite: Architecture 76.206★.

Architecture 76.212★ Elective Course
Visual Design
An analytical study of design principles including arrangement, composition, form, order, rhythm, colour and texture.
Day division, Fall or Winter term: Lectures three hours a week.

Architecture 76.302★ Theories Elective
History of Canadian Architecture
Canadian architecture from the seventeenth century to the present day, covering both stylistic and technological development with an emphasis on the latter. Building styles, methods and materials are considered in the context of the social and economic conditions of the time with a concentration on the analysis of the architectural elements of design and construction methods. (Also listed as Art History 11.302★.)
Prerequisites: Architecture 76.120★ and 76.121★ or equivalents or permission of the School.
Day division, Fall or Winter term: Lectures, seminars three hours a week.

Architecture 76.307★ Theories Elective
History of Architectural Theory
An exploration of architectural intentions in the early period of Western history, with special emphasis on Renaissance treatises and ideas. Architectural intentions are examined in relation to shifting world-views, forming the basis of historical interpretation.
Day or Evening division, Fall or Winter term: Lectures three hours a week.

Architecture 76.308★ Theories Elective
Origins of Modern Architecture
An exploration of architectural theories with special emphasis on the European context from the seventeenth century to the late nineteenth century. This crucial period marks the beginning of the modern era and provides a key for a fuller understanding of the problems facing architecture today.

Day or Evening division, Fall or Winter term: Lectures three hours a week.

**Architecture 76.309★ Theories Elective
History and Theory of the Avant-Garde**

An exploration of architectural theories with special emphasis on the development of the Avant-Garde in the early twentieth century. The course develops a specific understanding of the Avant-Garde within the larger framework of modernism.

Day or Evening division, Fall or Winter term: Lectures three hours a week.

**Architecture 76.315★ Theories Elective
Theories of Landscape Design**

An introductory course intended to bring to the student an awareness of landscape architecture as the total organization of outdoor space. A consideration of historical, cultural, economic and political factors provides a frame for reference for the understanding of spatial organization in both urban and rural areas of human settlement. Emphasis is given to the development of landscape design in the fifteenth to the nineteenth centuries.

Day division, Fall or Winter term: Lectures three hours a week.

**Architecture 76.318★ Theories Elective
Design of Cities**

A study of the architecture of the city. This course examines the form, meaning and qualitative experience of urban composition. Significant artifacts in the development of Western European civilization are analyzed and used as a basis for exploring the shape and values of North American cities. See also related workshop, Architecture 76.328★.

Prerequisite: Architecture 76.204★ or permission of the School.

Day division, Fall or Winter term: Lectures three hours a week.

**Architecture 76.319★ Theories Elective
Theory of City Form**

This course examines current design attitudes affecting the physical morphology of cities. These attitudes are studied from the standpoint of the relationship between practical and functional aspects on the one hand, and man's symbolic and psychic perceptions on the other.

Prerequisite: Architecture 76.204★ or permission of the School.

Day division, Fall or Winter term: Lectures three hours a week.

**Architecture 76.328★ Elective Course
Workshop: The Architecture of Urban Space**

This workshop undertakes design explorations that are directed towards the search for aesthetic form and meaning in urban space, with particular application to the Canadian context. It is project-oriented and refers to precedents as established in Architecture 76.208★.

Prerequisite: Architecture 76.208★ or permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 76.391★ Theories Elective

Selected Topics: Studies in Theory and History of Architecture

The course focuses on one specific aspect of architecture in the area of theory and history. Course offerings change from year to year.

Prerequisite: Permission of the School.

Day division: Fall or Winter term.

Architecture 76.392★ Elective Course

Selected Topics: Workshops in Theory and History of Architecture

Workshop focuses on one specific aspect of architecture in the area of theory and history. Workshop offerings change from year to year.

Prerequisite: Permission of the School.

Day division, Fall or Winter term.

Architecture 76.408★ Theories Elective

Foundations of Modernism in Architecture

This course examines major critical perspectives as they are applied to architecture as a fine art. The debate between classicism and romanticism with consideration of its cultural roots establishes the basis of the course.

Day division, Fall or Winter term: Lectures three hours a week.

Architecture 76.423★ Elective Course

Society and Shelter

An examination of buildings and shelter as human and social products. Major areas of concern include the impact of built form on social behaviour and thought; the perception of the built environment and the design and construction of buildings as social processes. (Also listed as Sociology 53.339★.)

Day division, Fall or Winter term: Lectures three hours, seminars three hours a week.

Architecture 76.425★ Elective Course

Workshop: User Analysis and Building Performance

Seminars, individual and team projects to develop skills in the analysis of building performance. Examination of occupancy analysis, safety and risk assessment, post-occupancy evaluation, and social impact assessment.

Prerequisite: Permission of the School.

Day division, Fall and/or Winter term: Six hours a week.

Architecture 76.440★ Theories Elective

Directed Studies Abroad: Theory

A survey of the architectural and urban history of a specific culture. These discussions address the present reality of a country, region or city being visited by the Fourth year of the program.

Prerequisite: Clear standing to Fourth year and permission of the School.

Day division, Fall term: Lectures three hours a week.

Architecture 76.452★ Core Course

Architectural Research and Criticism

This course is intended to prepare the student for the independent research and design work to be undertaken in the Fifth year. It includes work related to the nature of research and criticism in architecture, and to their application to the particular tasks of Fifth year. Debate and discussion of major issues pertaining to architecture is encouraged. The students are expected to develop their critical skills, and to identify their personal positions on architectural issues.

Day division, Winter term: Lectures and seminars four and one-half hours a week.

Architecture 76.488★ Elective Course

Independent Study

Architecture 77.113★ Core Course

Structures in Architecture

An introduction to structural planning, including a historical survey of structural systems and details and the study of

the factors involved in the synthesis of a suitable structural scheme. An introduction to the science and the structural properties of materials.

Day division, Fall term: Lectures three hours a week, laboratory two hours a week.

Architecture 77.130★ Core Course
Building Construction 1

A study of design and construction processes. An introduction to drawings and specifications, followed by a detailed study of construction techniques used by the principal building trades to translate the design into a building. Emphasis is placed on the proper selection of sub-systems and on the factors that affect the quality of construction.

Day division, Winter term: Lectures three hours a week.

Architecture 77.135★ Elective Course
The Nature and Behaviour of Materials

An introduction to the fundamentals of all materials, natural and man-made, and an analysis of their basic organizational patterns and form; an investigation of materials science including cohesion, elasticity, strain energy, work of fracture, crack stopping and the general theory of strength; a comparative survey of the metallic and non-metallic traditions of man, culminating in an exploration of plastics, composites and the materials of the future.

Text: Gordon, *The New Science of Strong Materials*.

Day division, Fall or Winter term: Lectures three hours a week.

Architecture 77.205★ Core Course
Environmental Controls 1

Principles of creating a long-lasting, comfortable, controlled environment in Canadian climates by enclosure. Includes planning for and against solar radiation, economic insulation, ventilation and psychrometrics, seasonal heating costs, natural lighting, thermal and visual comfort, principles of the design of the enclosure itself.

Prerequisite: Architecture 77.130★ or permission of the School.

Day division, Fall term: Lectures three hours a week.

Architecture 77.213★ Core Course
Structural Analysis in Architecture

Statics and strength of materials. Mechanical properties of structural materials. Application of statics and strength of materials to problems of structural elements in the context of total building structures.

Day division, Fall term: Lectures three hours a week, laboratory two hours a week.

Architecture 77.230★ Core Course
Building Construction 2

A study of building enclosures for the Canadian climate. A review of the principles of heat transfer, psychrometry and air movement. The techniques used to control the movement of heat, water and air through the enclosure. The application of these techniques to roofs and windows and to wood, concrete, masonry and metal walls.

Day division, Winter term: Lectures three hours a week.

Architecture 77.300★ Elective Course
Lighting for Architecture

Natural and electric lighting as part of the visual and perceptual processes of revealing two- and three-dimensional objects and spaces. Measurement of light, units and engineering standards. Basic calculations and design methods including the use of models. Characteristics of light sources for economy and colour rendering. Discomfort and disability. Concepts of visual performance.

Day or Evening division, Fall or Winter term: Lectures three hours a week.

Architecture 77.302★ Elective Course
Acoustics in Architecture

Recapitulation of fundamentals. Sound in enclosures, including interior design of auditoria and special applications. Sound reproduction and reinforcement systems. Acoustic privacy and protection, sound control in buildings, materials for noise control, community noise, industrial noise. Acoustic measurements and instrumentation.

Day division, Fall or Winter term: Lectures two hours, laboratory two hours a week.

Architecture 77.303★ Elective Course
Energy and Form

The purpose of the course is to provide the student with a body of knowledge concerning energy as a criterion in decision-making for architectural design. Specifically, the course covers conventional energy resources and the state of the art of alternative energy resource systems with respect to building shape, size, materials, openings, orientation, siting and use.

Day division, Fall or Winter term: Lectures three hours a week.

Architecture 77.304★ Elective Course
Workshop: Energy and Form

Study of the relationship between environmental factors, energy and architectural form. Emphasis is placed on explorations into ways in which buildings and building elements can be planned and designed so as to take advantage of natural cycles in order to minimize the need for supportive energy inputs.

Prerequisite: Architecture 77.303★ or permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 77.305★ Core Course
Environmental Controls 2

Continuation of Architecture 77.205★, to include the acoustic environment within spaces and sound insulation by enclosure. The second part of the course deals with servicing systems in general, and their interaction with the rest of the building.

Prerequisite: Architecture 77.205★ or permission of the School.

Day division, Winter term: Lectures three hours a week, problems three hours a week.

Architecture 77.313★ Core Course
Structural Design in Architecture

Behaviour of structural elements and simple systems under load conditions of increasing severity. Simplified design of structural elements and systems. Comparative estimation of stresses and deformations. Use of structural testing laboratory to demonstrate behaviour path to failure.

Prerequisites: Architecture 77.113★ and 77.213★
Day division, Fall term: Lectures three hours a week, laboratory two hours a week.

Architecture 77.314★ Elective Course
Structural Analysis

Offered in the Department of Civil Engineering as Engineering 82.420★.

Architecture 77.316★ Elective Course
Structural Steel Design I

Offered in the Department of Civil Engineering as Engineering 82.325★/82.425★.

Architecture 77.326★ Elective Course

Workshop: Space Enclosure Systems

The exploration of space enclosure systems for a wide range of environments.

Prerequisite: Architecture 79.320★ or permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 77.330★ Elective Course

Performance of Building Materials

Study of materials available for building, with emphasis on their structure, properties, application and sustained performance over the life of a building.

Day division, Fall or Winter term: Laboratories, lectures, field trips four hours a week.

Architecture 77.335★ Elective Course

Workshop: Materials Application

Application of building materials, including the forming of building parts and the design of joints for performance and assembly. Practical constructions using new technology are emphasized.

Prerequisite: Architecture 77.330★ or permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 77.350★ Core Course

Design Economics

Principles of building economics. Determinants of building costs and their prediction. Discussions on uncertainty and investment economics. Systems and techniques of creative cost control for buildings during schematic design, design development, construction document preparation and construction. Prime emphasis is on the economic evaluation and choice from among alternatives during all phases of design process.

Prerequisite: Clear standing to Fifth year or permission of the School.

Day or Evening division, Fall or Winter term: Three hours a week.

Architecture 77.391★ Elective Course

Selected Topics: Studies in Architectural Technology

The course focuses on one specific aspect of architecture in the area of architectural technology. Course offerings change from year to year.

Prerequisite: Permission of the School.

Day division, Fall or Winter term.

Architecture 77.392★ Elective Course

Selected Topics: Workshop in Architectural Technology

Workshop focuses on one specific aspect of architecture in the area of architectural technology. Workshop offerings change from year to year.

Prerequisite: Permission of the School.

Day division, Fall or Winter term.

Architecture 77.420★ Elective Course

Structural Morphology

Concepts and models bridging geometric morphology and architecture. Hierarchies of dimensional spaces. Planar and spatial orders. Form aggregation and space subdivision within the laws of geometric compatibility and formal rigidity. Size, similitude and isomorphisms.

Day division, Fall or Winter term: Lectures three hours a week.

Architecture 77.424★ Elective Course

Structural Planning in Architecture

Structural planning process. Values, contexts, criteria and parameters of structural planning. Role of information and codes. Classification and comparative study of structural systems. Interaction and integration of structures with other building systems. Structural details. Structural planning data and guidelines. Case studies and exercises. (Also listed as Engineering 82.430★.)

Day division, Fall or Winter term: Lectures three hours a week.

Architecture 77.428★ Elective Course

Workshop: Structure and Form

Study of structural nature of non-conventional space enclosure systems like cable structures, membranes, shells, submerged structures, excavated structural forms and lunar structures.

Prerequisite: Architecture 77.420★ or permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 77.440★ Elective Course

Design for Construction

Conceptual and detail design in relation to materials and building construction. The effects on building design of building codes, zoning bylaws, approvals, processes and legislation, and the basic organization of the building industry. An overview of principles of cost estimating and cost control and the implications for building design decisions.

Prerequisite: Architecture 77.330★ or permission of the School.

Day division, Fall or Winter term: Visits, lectures, seminars three hours a week.

Architecture 77.488★ Elective Course

Independent Study

Architecture 78.320★ Core Course

Introduction to Professional Practice

An overview of the practice of architecture. Topics include professional organization and conduct, the architect's services, business law, office organization and management, contract documents, building codes, contract management, cost control, accounting and site supervision. Presentation through lectures, guest speakers and case studies from professional practices and construction representatives in the area.

Prerequisite: Clear standing to Fifth year.

Day division, Winter term: Lectures three hours a week.

Architecture 78.323★ Elective Course

Workshop: Landscape Architecture

The objective of this course is to introduce the student to the practical significance of landscape elements as they relate to built-form by integrating structure and site.

Prerequisite: 76.205★ or permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 78.340★ Elective Course

City Organization and Planning Processes

An overview of the structure, form and functioning of Canadian and other countries' cities; methods for intervening in and directing processes and solving city problems: an introduction to urban problems, potentials and solutions. Topics include: physical infra-structure and forms of cities; urban facilities and networks; ecosystems, demography and social organization, and government and politics; quality of life, goals and perceptions of urbanites; urban

management, development, regulation and codes, design, planning and policy-making. Lectures, guest lecturers, reading assignments.

Day division, Fall or Winter term: Three hours a week.

Architecture 78.345★ Elective Course

Workshop: Urban Design

A project-based workshop investigating current design attitudes and solutions affecting the physical morphology of cities. Students undertake formally sophisticated urban design projects, explore various procedures and discuss basic urban design ideas.

Prerequisite: Permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 78.349★ Elective Course

Workshop: City Organization and Planning Processes

Interdisciplinary investigation, analysis and synthesis of the institutions, processes, environments and demography of Canadian cities. Seminars, guest lecturers, field investigations and individual and team projects.

Prerequisite: Permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 78.350★ Elective Course

The Development of Human Shelter

Emphasis is on the background factors pertaining to housing in both industrial and Third-World countries; traditional and contemporary housing approaches; social housing and people's right to adequate housing. Overviews, case studies and guest lecturers.

Day division, Fall or Winter term: Three hours a week.

Architecture 78.391★ Elective Course

Selected Topics: Urban Studies

The course focuses on one specific aspect of architecture in the area of urban studies. Course offerings change from year to year.

Prerequisite: Permission of the School.

Day division, Fall or Winter term.

Architecture 78.392★ Elective Course

Selected Topics: Workshop in Urban Studies

Workshop focuses on one specific aspect of architecture in the area of urban studies. Workshop offerings change from year to year.

Prerequisite: Permission of the School.

Day division, Fall or Winter term.

Architecture 78.488★ Elective Course

Independent Study

Architecture 79.111★ Core Course
Computer Craft

This course is an introduction to architectural computing as a design, presentation and documentation medium; it emphasizes principles and techniques of application rather than details of the underlying technology. It is organized around extensive practical work using Carleton's computer graphics facilities (GKS) and the FORTRAN 77 programming language. No previous computer background is assumed. FORTRAN 77 is introduced, step by step, as the course progresses.

Prerequisite: Registration in the Architecture degree program.

Day division, Fall term: Lectures three hours a week, laboratory one hour a week.

Architecture 79.115★ Elective Course

Mathematics in Architecture

Mathematics as a way of thinking and an abstract process as this relates to architecture; a survey of the mathematics applicable to architectural technology and other courses in the program, including Euclidian, non-Euclidian and analytic geometries, probability and statistics. The course is developed as an exploration of mathematics as a discipline that can clarify many aspects of design and support a student's overall education.

Day division, Winter term: Lectures three hours a week.

Architecture 79.303★ Elective Course

Workshop: Theatre Production

A workshop course involving students in the design and fabrication of theatre productions, one of which is staged on campus. Visiting directors, designers, technical consultants and others are invited to discuss their approach to theatre production and to offer advice and criticism on student projects. There are visits to theatres and production facilities.

Prerequisite: Permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 79.312★ Elective Course

Problems in Computing

Introduction to various types of non-numeric data, their representation within primary and secondary storage, and the manipulation of various representations. Comparative evaluation of languages for non-numeric problems. Student projects.

Prerequisite: Permission of the School.

Day division, Fall or Winter term: Lectures two hours a week, laboratory two hours a week.

Architecture 79.320★ Elective Course

The Geometry of Form

The development of a basic vocabulary of form through identification of the rules for combining and relating the minimal identifiable elements of geometric form. Investigation of the methodologies for changing those identities in order to generate entirely new forms. Study of planar and space geometries with special emphasis on polygons and polyhedra, their singular, close and loose-packing properties. Discussions on form; geometric operations, like vertex motion, folding, reciprocation and truncation.

Text: Williams, *Natural Structure*.

Day division, Fall or Winter term: Lectures three hours a week.

Architecture 79.326★ Elective Course

Workshop: Computer Applications

Applications of existing computer programs and programming techniques to various architectural problems. Software, state of the art and applications are extensively covered. Project work may be user-orientated on the basis of existing software or development of original work. Student projects.

Prerequisite: Permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 79.328★ Elective Course

Workshop: Computer Graphics

Use of interactive graphics hardware systems and study of file structures for graphics processing. Developmental work leading toward computer-generated art as well as implementation of production-oriented user display software is encouraged. Student projects.

Prerequisite: Architecture 79.312★ or permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 79.330★ Elective Course**Workshop: Co-operative Problem Solving**

Group training in the creative exchange and development of ideas; group problem-solving sessions focus on participation and roles, listening, itemized response, use of metaphor and analogy, forcefit, closure; follow-through techniques; visual brainstorming and generative graphics. Student project. Limited enrolment.

Prerequisite: Permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 79.332★ Elective Course**Workshop: The Anatomy of Architecture**

An exploratory workshop into the architectural anatomy of selected contemporary buildings. Use of graphic techniques of analysis to develop an understanding of their basic compositional principles and language.

Prerequisite: Permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 79.333★ Elective Course**Workshop: Architecture as Painting**

The purpose of this course is to analyze architecture for its elemental, formal and narrative properties. These relationships are then "re-represented" through the medium of painting. Architecture as analogy to painting.

Prerequisite: Permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 79.340★ Elective Course**Workshop: Visual Design**

A workshop program to increase the student's capacity to visualize and communicate in several graphic media, and also to increase sensitivity to form, structure, space, texture and colour. Historical investigations may be involved.

Prerequisite: Permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 79.341★ Elective Course**Workshop: Photography**

Experimentation with photography as a means of visual research and communication of the social and built aspects of the environment. Familiarity with the basic techniques of photography is required as a prerequisite. Students are required to prepare a photographic essay that explores some aspect of the relationship between people and the built environment.

Prerequisite: Permission of the School.

Day division, Fall or Winter term: Six hours a week.

Architecture 79.391★ Elective Course**Selected Topics: Studies in Architectural Techniques**

The course focuses on one specific aspect of architecture in the area of architectural techniques. Course offerings change from year to year.

Prerequisite: Permission of the School.

Day division, Fall or Winter term.

Architecture 79.392★ Elective Course**Selected Topics: Workshop in Architectural Techniques**

Workshop focuses on one specific aspect of architecture in the area of architectural techniques. Workshop offerings change from year to year.

Prerequisite: Permission of the School.

Day division, Fall or Winter term.

Architecture 79.488★ Elective Course**Independent Study**

Design Studios/Design Thesis/Research Thesis

Architecture 80.111 Core Course**Design Studio 1A (1.5 credits)**

An introductory studio directed toward the development of basic design skills. Projects include: abstract two-dimensional and three-dimensional exercises. The studio also has assignments in photography, colour theory, life drawing and perspective.

Prerequisite: Registration in the Architecture degree program.

Day division, Fall term: Scheduled studio time 12 hours a week.

Architecture 80.112 Core Course**Design Studio 1B (1.5 credits)**

A continuation of Architecture 80.111. Ordering principles that form a basis for architecture are investigated at an elemental level. Design projects are semi-abstract and highly constrained. The studio also includes assignments in photography, colour theory, life drawing and perspective.

Prerequisite: Registration in the Architecture degree program.

Day division, Winter term: Scheduled studio time 12 hours a week.

Architecture 80.211 Core Course**Design Studio 2A (1.5 credits)**

The application of ordering principles in architecture is considered in response to site, climate, function and materials and methods of construction. Small-scale projects develop in complexity through both terms.

Prerequisites: Architecture 80.111 and 80.112.

Day division, Fall term: Scheduled studio time 12 hours a week.

Architecture 80.212 Core Course**Design Studio 2B (1.5 credits)**

A continuation of Architecture 80.211. Small-scale projects develop in complexity during this term.

Prerequisites: Architecture 80.111 and 80.112 and have taken 80.211.

Day division, Winter term: Scheduled studio time 12 hours a week.

Architecture 80.304 Core Course**Design Studio 3A (1.5 credits)**

The principles, vocabularies and craft of architecture are considered within the contexts of purpose, place and precedent. Projects address the subject of small-scale building in the natural and urban landscape.

Prerequisites: Architecture 80.211 and 80.212.

Day division, Fall term: Scheduled studio time 12 hours a week.

Architecture 80.306 Core Course**Design Studio 3B (1.5 credits)**

The continuation of the theme of Architecture 80.304 with an increase in project scope and complexity.

Prerequisites: Architecture 80.211 and 80.212 and have taken 80.304.

Day division, Winter term: Scheduled studio time 12 hours a week.

Architecture 80.403 Core Course**Design Studio 4A (1.5 credits)**

The principles and vocabulary of construction and technique are considered as primary generators of architectural form. Projects are based on the design development of both small- and large-scale projects.

Prerequisites: Architecture 80.304 and 80.306.

Day division, Fall term: Scheduled studio time 12 hours a week.

See also Directed Studies Abroad (p. 324).

Architecture 80.405 Core Course

Design Studio 4B (1.5 credits)

The principles and vocabularies arising from the relationship between architecture and the urban context in which it is situated. Projects focus on part of the urban context.

Prerequisites: Architecture 80.304, 80.306 and have taken 80.403.

Day division, Winter term: Scheduled studio time 12 hours a week.

Architecture 80.440 Core Course

Design Studio 5A (1.5 credits)

Design projects of a complexity and theoretical rigour, appropriate to Fifth year, set by faculty. Visiting Critic Studios may be taken as part of this studio.

Prerequisite: Clear standing to Fifth year.

Day division, Fall term: Scheduled studio time 12 hours a week.

Architecture 80.458 Core Course

Design Studio 5B (2.5 credits)

Student-initiated design project. Students propose a design idea or issue to be developed in depth. With the advice and approval of the studio faculty, the student defines and undertakes a suitable building project.

Prerequisite: Clear standing to Fifth year and approved proposal.

Day division, Winter term: Scheduled studio time 20 hours a week.

Architecture 80.460 Core Course

Research Thesis 5.1 (2.5 credits)

Provides an opportunity for scholarly research in topics related to architecture. The thesis proposal, developed by the student and prospective tutor, requires approval by the Thesis Committee. The final submission must be within a prescribed format similar to graduate theses in humanities, social sciences, arts and engineering.

Prerequisites: Clear standing to Fifth year and approved thesis proposal.

Day division, Fall term.

Architecture 80.461 Core Course

Research Thesis 5.2 (2.5 credits)

As Architecture 80.460 (Research Thesis 5.1). In exceptional cases the Thesis Committee may allow this to be a continuation of Architecture 80.460.

Prerequisite: Clear standing to Fifth year and approved thesis proposal.

Day division, Winter term.

Architecture 80.466 Core Course

Design Thesis 5.1 (2.5 credits)

Provides opportunity for in-depth exploration of an architectural idea or issue through media associated with the art of design. The thesis proposal, developed by the student and prospective tutor, requires approval by the Thesis Committee. The final submission must be in a publishable format, which could include, for example, drawings, models and/or audio-visual productions.

Prerequisites: Clear standing to Fifth year and approved thesis proposal.

Day division, Fall term.

Architecture 80.467 Core Course

Design Thesis 5.2 (2.5 credits)

As Architecture 80.466 (Design Thesis 5.1). In exceptional cases the Thesis Committee may allow this to be a continuation of Architecture 80.466.

Prerequisites: Clear standing to Fifth year and approved thesis proposal.

Day division, Winter term.

Architecture 80.470 Core Course

Selected Topics Studio (2.5 credits)

This studio is a vehicle for in-depth exploration of an architectural idea or issue that has originated from the research interests of a faculty member. It will run as a design-research studio-seminar with special inputs and visiting critics. There will be a directed studies component, given by the professor leading this studio, in one of the six areas of study defined under the School of Architecture in the Graduate Calendar. The primary aim of this component will be to reinforce the explorations in the studio.

Prerequisites: Clear standing to Fifth year and permission of the School.

Day division, Fall term.

School of Industrial Design

Mackenzie Building, Room 291
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Officers of Instruction

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Director, Centre for Industrial Design Research
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B. Wozniak

Assistant Professors
M. de Leeuw
J. Ostiguy

Instructors
A. Boykiw

Adjunct Research Professors
T. Moore
T. Parsons

School Registrar
R.L. Fleming

General Information

Industrial design* is a creative activity, the aim of which is to determine the formal qualities of objects produced by industry. These formal qualities include the external features, but are principally those structural and functional relationships that convert a system to a coherent unit, both from the point of view of the producer and of the user.

Industrial design tends to embrace all aspects of human environment that are conditioned by industrial production. In the future, the traditional activity of design for growth may continue to be essential. It will be necessary, however, to develop a design activity that contributes to the regulating of growth processes, the conservation of resources and the protection of the environment.

*As defined by the International Council of Societies of Industrial Design.

Bachelor of Industrial Design Degree Program

In September 1973, Carleton University initiated the First year of a new four-year program leading to the Bachelor of Industrial Design degree.

The Bachelor of Industrial Design degree is awarded on successful completion of the four-year program of studies. The program is structured to meet the requirements of the developing profession of industrial design. This implies an education with a solid general background, enabling the designer to communicate with experts in other disciplines.

It also implies development of expertise in designing for one or more specific sectors in the wide field of application of industrial design. The program of studies was initiated as a joint venture of the Faculty of Engineering and the School of Architecture.

Admission Requirements

First Year

The Ontario Secondary School Diploma or the equivalent, including six Ontario Academic Courses with a minimum average of 65 percent. The six OACs must include courses in Physics, Chemistry, Algebra and Geometry, and Calculus. It is strongly recommended that all applicants also have an OAC in English.

In order to compete successfully for admission in this limited enrolment program, it is strongly recommended that the candidate present a portfolio of any kind of work that could demonstrate the applicant's creativity and aptitude for the study of industrial design. Following the initial review of each submitted portfolio, candidates whose portfolios are considered acceptable may be contacted to arrange for a personal interview. Such an interview will give the School of Industrial Design a clearer idea of the seriousness of the candidate and afford the candidate an opportunity to see and learn actively about the program of the School of Industrial Design.

Advanced Standing and Transfer of Credits

Applications for admission with advanced standing to the Second or subsequent years of the program leading to the Bachelor of Industrial Design degree will be evaluated on an individual basis. Advanced standing for academic subjects completed at another university or college will be evaluated for equivalence to the program requirements of the School of Industrial Design. Transfer of credit for projects in such programs as industrial design, engineering design, architecture, etc., completed at another university or college may also be considered, provided the grade is satisfactory and the student shows evidence of aptitude for design studio work by the production of a portfolio of original drawings or photographs, etc., and as a result of an interview with a designated member of the faculty of the School of Industrial Design.

Graduates from degree programs at Carleton University in Architecture, Engineering, Science and Commerce who meet the admission requirements for the First year of the B.I.D. degree program, could expect to be able to complete the work for the B.I.D. degree in two years if their first degree program includes, minimally:

- 85.100★ Introduction to Industrial Design
- 85.101★ Industrial Design Analysis
- 91.101★ Engineering Graphics
- 91.102★ Orientation to Engineering
- 43.100 Introduction to Economics
- 49.100 Introductory Psychology

Mature Applicants

Persons who lack the normal entrance requirements as published in this Calendar but who have been away from full-time studies for a minimum of two years and who are 21 years of age or over by December 31 of the year in which they wish to enrol, may receive consideration for admission to a degree program.

Selective Admission

It should be noted that the number of student spaces in the School of Industrial Design is limited. Because of this, it may not be possible to grant admission to all applicants who meet the foregoing requirements. Admission, therefore, will be on a selective basis with preference given to those candidates who show the highest promise of success in the course.

Readmission

Students who have been absent from the program for one Fall/Winter session are normally required to apply for re-admission before registration. Exceptions will be made in the case of students holding either a Letter of Permission (p. 43) or written approval from the School of Industrial Design.

Former students who have forfeited their undergraduate status must request readmission by following the normal admission procedures, including the submission of an updated portfolio of work.

Course Requirements

First Year	Lectures and Tutorials		Laboratory and Studio Work	
	Fall	Winter	Fall	Winter
69.107★ Elementary Calculus I	4	—	—	—
69.117★ Elementary Algebra	—	4	—	—
43.100 Introduction to Economics	3	3	—	—
75.100 Introductory Physics	3	3	3	3
85.100★ Introduction to Industrial Design	3	—	—	—
85.101★ Industrial Design Analysis	—	4	—	—
85.130★ Introductory Projects 1A	1	—	6	—
85.131★ Introductory Projects 1B	—	1	—	6
91.111★ Mechanics-Statics	—	3	—	3
Introduction to Computing (note a)	3	—	—	—
Hours per week	17	18	9	12

Note a

Must be one of Computer Science 95.100★, 95.101★ or 95.103★

Second Year	Lectures and Tutorials		Laboratory and Studio Work	
	Fall	Winter	Fall	Winter
85.211★ Mass-Production Technology for Industrial Design A	3	—	3	—
85.212★ Mass Production Technology for Industrial Design B	—	3	—	3
85.221★ Form and Colour Fundamentals A	2	—	4	—
85.222★ Form and Colour Fundamentals B	—	2	—	4
85.231★ Projects IIA	1	—	6	—
85.232★ Projects IIB	—	1	—	6
49.100 Introductory Psychology	3	3	—	—
Architecture, Engineering or Computer Science Electives (note a)	3	3	3	3
Electives	3	3	—	—
Hours per week	15	15	16	16

Note a

Total course value equivalent minimally to 1.0 credit.

Third Year	Lectures and Tutorials		Laboratory and Studio Work	
	Fall	Winter	Fall	Winter
42.224★ Basic Marketing	—	3	—	—
49.372★ Perception	3	—	—	—
85.330 Projects IIIA (note a)	4	—	12	—
85.331 Projects IIIB (note a)	—	4	—	12
85.351★ Colloquium Cultural Subjects A	3	—	—	—
85.352★ Colloquium Cultural Subjects B	—	3	—	—
85.360★ Anthropometrics and Ergonomics	2	—	3	—
85.361★ Anthropometrics and Ergonomics Workshop	—	2	—	3
Electives (note b)	3	3	3	3
Hours per week	15	15	18	18

Note a

The project courses, although given in one term each, are counted as full courses with one credit each.

Note b

It is recommended that students take Industrial Design elective courses or Engineering courses, but they must take one of the following: Industrial Design 85.321★, 85.322★, or 85.420★.

Fourth Year	Lectures and Tutorials		Laboratory and Studio Work	
	Fall	Winter	Fall	Winter
85.400★ Professional Practice in Industrial Design	3	—	—	—
85.401★ Industrial Design Seminar (note a)	—	3	—	—
85.430 Major Projects (note b)	2	2	14	14
85.431 Minor Projects A	2	2	6	6
85.432 Minor Projects B	2	2	6	6
85.440★ Industrial Practice Internship Field Reports	—	—	—	—
Electives (note c)	3	3	—	—
Hours per week	12	12	26	26

Note a

The Industrial Design Seminar takes place in the Winter term, and therefore requires registration in that term. However, most of the preparatory work that students are required to do must be completed in the Fall term.

Note b

The Major Industrial Design Projects course has a value equivalent of 2.0 credits.

Note c

The electives must be chosen in consultation with the School on the following principles:

- (i) The electives chosen should serve to deepen the student's understanding of fields related to Industrial Design or disciplines that are relevant for industrial designers;
- (ii) The electives chosen should preferably be advanced courses;
- (iii) The electives chosen should preferably be related to the Industrial Design projects and provide basic and/or actual information for these projects.

Industrial Practice Internship

In order to provide the student with a realistic view of the possibilities and limitations of industry, and to establish and maintain good contacts and communication among the School of Industrial Design, the students and industry, the student in Industrial Design has to spend a period of time as an intern in industry.

These periods of industrial practice internship are to be taken prior to graduation and to be chosen in an industry that will satisfy the faculty member involved. Students should find a suitable internship on their own initiative. In cases where a suitable internship cannot be found, alternate arrangements will be considered.

If the industrial practice internship is not completed in time or if it is not proved successful, the student will not be awarded the Bachelor of Industrial Design degree until the missing internship is completed and proof of satisfactory results is given.

During the industrial practice internship, a study of the relationship between industrial design and the technology, production process, or functional issues at hand will be undertaken. A report is to be submitted to the School, to be filed in the technical data facilities of the School of Industrial Design and made accessible to other students. See course Industrial Design 85.440★.

Industrial Design Projects

The Industrial Design projects in the First, Second, Third and Fourth years will represent either real or simulated situations to be developed to the stage of drawings, models, full-scale mock-ups or simulated finished products, as appropriate.

The design experience in Industrial Design projects synthesizes and integrates all the other course work and draws on the resources from those courses, including the disciplinary expertise of the staff. It should also attempt to explore and exploit knowledge available on campus and within institutions outside.

Industrial Design projects, even when they are research-oriented, will only be acknowledged when they are aiming at predetermined goals, which should be of a concrete nature, preferably objects to be made by industry. The subject or theme of the project will be determined by agreement between the student and the faculty involved.

The usual pattern of activities in the execution of an Industrial Design project is, in its simplest form, composed of three subsequent phases:

- (a) an analytical informative phase;
- (b) a creative or formative phase;
- (c) a descriptive or communicative phase.

Progress within this pattern of activities is made by feedback and feed-forward with intermediate evaluations. A project will not be considered complete if any of the three major phases has not been passed through, documented and evaluated.

The student will normally be required to keep a record of working hours spent on the project. This record must be available for inspection, and must be one of the documents submitted for examination.

The School of Industrial Design may conditionally approve an intended collaboration of students in the execution of Industrial Design projects provided that proper means of evaluation and examination are built into the project to ensure the identification of each student's contribution.

Industrial design projects will be examined by the appropriate

body after each of the phases and on the planned and agreed deadlines. Students who do not meet the deadlines for submission of project work will be considered to have withdrawn from examination.

It should be noted that supplemental examination privileges will not be granted for First-, Second-, Third-, and Fourth-year Industrial Design project courses (85.130★, 85.131★, 85.231★, 85.232★, 85.330, 85.331, 85.430, 85.431, and 85.432). This regulation implies that students who obtained a grade of less than C- for such a course must repeat the course and attain a grade of C- or better in order to proceed in the program.

The execution of Industrial Design projects will require professional equipment for sketching, drawing, etc., which will not be provided by the School of Industrial Design. A list of recommended equipment is available from the instructors of each project course, where applicable.

The execution of Industrial Design projects will require materials for sketching, drawing, reproduction, model-making, etc. Moreover, travel costs may be involved. The level of total expenditure will vary considerably with the nature of the theme or subject of the project. The policy of the School of Industrial Design is to see that such costs are only partly borne by the student and that co-operation with industry and institutions outside the University may provide further funds.

Documents, sketches, drawings, models, etc. resulting from Industrial Design projects must be registered with the administration of the School of Industrial Design as the authorized work of the student while studying at the School of Industrial Design of Carleton University.

Resulting documents, sketches, drawings, models, etc. from Industrial Design projects must be retained by the student for a minimum period of two years after production. During this period, the student must have these results available in good condition for the School of Industrial Design for exhibition, display or publication purposes. During this time, the student will be required to advise the Director of the School, well in advance, about any transaction, exhibition, display or publication, that will involve these results.

Students are not allowed to use the results of Industrial Design projects for commercial purposes without written permission of the Director of the School of Industrial Design.

Fourth-Year Industrial Design Projects

All regulations and arrangements as described under "Industrial Design Projects" apply to the Fourth-year projects. Over and above these regulations, Fourth-year Industrial Design projects are subject to the following:

All Fourth-year students are required to undertake Industrial Design 85.430, Major Projects, 85.431, Minor Projects A, and 85.432, Minor Projects B in the same academic year.

Fourth-year Industrial Design projects are conducted, supervised, administered and examined by the Industrial Design Projects Committee, reporting to the Faculty Board of the School of Industrial Design.

The subjects or themes of Industrial Design projects are determined by agreement between the student and the Industrial Design Projects Committee. This agreement should be reached before the end of Winter term in the Third year.

A student who chooses to do an Industrial Design project that is based on special techniques or technologies, is

required to propose an expert in that special field to be present at the evaluations of the project to assist the Industrial Design Projects Committee.

Students registering in Fourth year, who have failed to reach an agreement with the Industrial Design Projects Committee before the end of the Third year, are given assignments for Fourth-year projects by the Committee after registration. Such assignments are binding.

In order to reflect the actual situation of the professional industrial designer, the student is required to undertake more than one project to be executed simultaneously in Fourth year. The student is required to plan the work on the Fourth-year Industrial Design projects well in advance, in consultation with the Industrial Design Projects Committee.

The proposal for a work plan must be submitted to the Industrial Design Projects Committee for approval before the end of the Winter term of Third year.

The specified record of working hours spent on Fourth-year Industrial Design projects must be available for inspection by the Committee at any time and be among the documents to be submitted at the final examination.

General Information

Course Pattern

The program of study in Industrial Design is necessarily structured to meet the requirements in education and training for a professional career in industrial design.

For purposes of scheduling, each student is considered as being in a particular year of the program. In order to move through the program, a student must not be deficient in the Industrial Design project course(s) and in no more than one of the other courses. This requirement does not relate to a student's academic status, but only to the nominal year designation. However, a student who is taking courses in Fourth year while designated as being in Third year, has the responsibility for satisfactorily resolving any prerequisite deficiencies and difficulties in the course program.

Course Level

The year level of a course can be read from the first digit to the right of the decimal in the course number; for example, the course Industrial Design 85.331 is at Third-year level and 85.430 is at Fourth-year level. This indicates the general academic background required. Specific prerequisites are also given where appropriate. Students may take courses at a year level higher than their current registration; they are advised, however, to consult the course instructor if they have doubts regarding their background preparation. In some cases, the School of Industrial Design may also be able to waive specific prerequisites.

Electives

The School of Industrial Design offers elective courses under its own jurisdiction. It is strongly recommended, however, that students in Industrial Design also choose from the wide variety of courses in the humanities, social sciences, engineering or multi-disciplinary courses offered in the University. Industrial Design projects usually represent complex situations which require background information that often will be better understood when supported by appropriate elective courses in other disciplines.

Qualifying-University-Year Courses

Qualifying-University-year courses cannot be used to satisfy any of the elective requirements in any year of the regular course pattern.

Timetables

All undergraduate courses of the School of Industrial Design are normally offered in the Day division only and are scheduled in the timetable of the University.

Student Responsibility

The student is responsible for knowing the regulations of the School of Industrial Design and for complying with them. Any exceptions to the regulations must be approved in writing by the School of Industrial Design Student Standing and Promotion Committee.

Carleton Industrial Design Students' Association

CIDSA organizes social and academic events to develop esprit de corps among Industrial Design students and faculty. The association also represents students within the School of Industrial Design regarding academic and/or policy matters to the University and the profession.

Grading System

Standing in courses will be determined by the School and will be shown by alphabetical grades. The grades used with their corresponding grade points are as follows:

A+	12	B+	9
A	11	B	8
A-	10	B-	7
C+	6	D+	3
C	5	D	2
C-	4	D-	1

Passed Supplemental Examination: D-

Notations to represent special circumstances are as follows:

Aeg

Aegrotat standing is a pass standing granted despite absence from the final examinations. It may be granted by the Committee on Student Standing and Promotion of the School of Industrial Design only in response to a student's written request. Aegrotat standing will be granted only in exceptional circumstances and if the term work has been of high quality.

F

Failure: no academic credit.

FNS

Failure, but with supplemental privileges withdrawn because of unsatisfactory term work or an unacceptably low mark in the examination. No academic credit.

Wdn

Withdrawn in good standing: no academic credit.

Abs

Absent from formally scheduled final examinations where the necessary term work has been completed. No supplemental privileges. No academic credit.

Def

Students who are absent from final examinations or who are unable to complete their course work for medical or compassionate reasons may apply to the Committee on Student Standing and Promotion of the School of Industrial Design for deferred examination privileges. Such applications must:

1. be made in writing to the Engineering Faculty Registrar's Office not later than one week after the date of the examination; and
2. be fully supported in the case of illness by a medical certificate or by appropriate documents in other cases.

Academic Standing, Promotion and Probation

The academic standing of each student in the B.I.D. program will be reviewed prior to fall registration. At that time, the student's previous record, including courses from the preceding Summer session and supplemental examination results, will be considered.

Grade-point averages and cumulative grade-point averages determine the academic standing of a student. They are calculated on the basis of course credits. Normally, a full (two-term) course has a value of 1.0 credit and a half (one term) course, indicated by a ★ after the course number, has a value of 0.5 credit. In the B.I.D. program, the courses Industrial Design 85.330 and 85.331, although offered in one term, have a course value equivalent to 1.0 credit each. The course Industrial Design 85.430 has a course value equivalent to 2.0 credits.

The 12-grade point system is set out above. The grade points earned in any specific course are determined by multiplying the grade points corresponding to the grade by the credit value of the course. Thus an A+ in a half-credit course will earn the student 6.0 grade points, while an A+ in a two-credit course would be worth 24 grade points. Grade-point averages are calculated by dividing the total accumulated grade points by the total credits.

To achieve satisfactory academic standing, the student must:

1. meet the grade-point average for the year of study just completed;
2. meet the cumulative grade-point average required for all courses taken as part of the Bachelor of Industrial Design program.

The required cumulative grade-point average and the grade-point average for the year are:

- 2.5 after one year of study;
- 2.8 after two years of study;
- 3.1 after three years of study;
- 3.4 after four years of study.

A year of study, as used here, refers to the student's period of study and not to the program year defined in the previous section of these regulations. A year's grade-point average is based on all courses taken during one Academic Year; calculation of the cumulative grade-point average is based on the courses from all Academic Years in which the student has been registered in Industrial Design. The most

recent grade obtained in each course will be used to compute the grade-point average.

3. not receive a grade of F, FNS or Abs in the year of study just completed in more courses than the allowable numbers listed below:

Number of Full Course Equivalents Taken	Maximum Number of Full Course Equivalent F, FNS or Abs Allowed
0.5—1.0	0
1.5—2.5	0.5
3.0—4.0	1.0
4.5—5.5	1.5
6.0 or more	2.0

4. achieve a grade point of 4.0 (C-) or better in each of the project courses.

After a review of grades, a student who no longer meets the requirements for satisfactory academic standing, will be placed on academic probation. A student may be on academic probation only once in the Bachelor of Industrial Design program.

A student on probation for reasons other than failure of a project course will not be allowed to register in any project courses.

A student on probation will be required to repeat the following courses from the previous year of registration:

1. any project course of the core program for which a grade less than C- was obtained;
2. any other core course that was failed.

Moreover, the student will be required to repeat or to replace any elective course of the previous year's registration that was failed.

A student on probation who fails to meet these conditions will lose undergraduate status and will be ineligible for future registration in the B.I.D. program.

Students without clear standing will not be permitted to register in the Fourth-year project courses.

Students with Advanced Standing

Students admitted with advanced standing must obtain an average appropriate to their level of admission but only those courses taken at Carleton University will be included in the evaluation.

Graduation

In order to fulfil the minimum graduation requirements for the degree of Bachelor of Industrial Design, a candidate must have met all the course requirements of the First to Fourth years, inclusive, with a cumulative grade-point average of at least 3.4. In addition, the candidate must have achieved a grade point of 4.0 or better in each of the Industrial Design project courses and be recommended by the School of Industrial Design.

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) in addition to all School regulations.

Degrees with Distinction

Upon recommendation of the School of Industrial Design, the notation "with High Distinction" may be made on the academic records of a candidate for the degree of Bachelor of Industrial Design. To be considered for this recommendation, the candidate is expected to obtain a grade-point average of at least 9.0 in the course requirements of the final year and, in addition, a grade-point average of at least 7.8 in the course requirements of the First to Fourth years, inclusive.

Upon recommendation of the School of Industrial Design, the notation "with Distinction" may be made on the academic records of a candidate for the degree of Bachelor of Industrial Design. To be considered for this recommendation, the candidate is expected to obtain a grade-point average of at least 7.8 in the course requirements of the final year and, in addition, a grade-point average of at least 6.6 in the course requirements of the First to Fourth years, inclusive.

Courses Offered

Industrial Design 85.100★

Introduction to Industrial Design

An overview of the theoretical background of the phenomenon industrial design, consisting of such topics as: the definitions and dimensions of design and industrial design, its nature and its historical evolution; the notion of quality; quality aspects in man-made objects; formal qualities as determinants for categories of design; design methods; design management in industry; professional practice of industrial design and industrial design promotion, nationally and internationally. Practising industrial designers are invited to present case studies of their activities. (Also listed as Architecture 76.206★.)

Day division, Fall term: Lectures and discussions three hours a week.

Industrial Design 85.101★

Industrial Design Analysis

The various problems involved in industrial design are analyzed. Among others: the relationship with principal techniques and mass-production technology; problems of uniformity and variety, specialty and versatility in production; problems of tolerances; the role of ergonomics and anthropometrics in design; industrial design and environment; speculations about future industrial design approaches with regard to pollution and conservation of resources; adaptation of value-analyses to the field of industrial design. (Also listed as Architecture 76.211★.)

Prerequisite: Industrial Design 85.100★ (Architecture 76.206★).

Day division, Winter term: Lectures and discussions four hours a week.

Industrial Design 85.130★

Introductory Projects IA

An introduction to the techniques of industrial design, including drawing and sketching as an aid to design, ideation and visualization, product drawing, presentation techniques, laboratory equipment and practices, introduction to the design process.

Prerequisite: Industrial Design 85.100★ (may be taken concurrently).

Day division, Fall term: Lectures and tutorials one hour a week, laboratory six hours a week.

Industrial Design 85.131★

Introductory Projects IB

This course deals with further notions of industrial design theory and practice, more specifically those dealing with the principles of product development; case studies. The emphasis is on the application of visual communication techniques in design, introduction to the fundamentals of photography.

Prerequisite: Industrial Design 85.130★.

Day division, Winter term: Lectures and tutorials one hour a week, laboratory six hours a week.

Industrial Design 85.211★

Mass Production Technology for Industrial Design A

This course attempts to generalize the transformation techniques for manufacturing materials in modern industry. The course presents a survey of the various techniques applied to material in its liquid, plastic, or solid state of aggregation. Part design requirements and relative cost factors for each of the processes are emphasized. Finishing, decorative techniques, and the role of production tooling; properties, cost factors, and limitations.

Precludes additional credit for Industrial Design 85.210, no longer offered.

Prerequisites: Industrial Design 85.100★, 85.130★.

Day division, Fall term: Lecture and tutorials three hours a week, laboratory three hours a week.

Industrial Design 85.212★

Mass Production Technology for Industrial Design B

Similar to Industrial Design 85.211★, this course attempts to generalize the transformation techniques for manufacturing materials in modern industry. The course presents a survey of the various techniques applied to material in its liquid, plastic, or solid state of aggregation. Part design requirements and relative cost factors for each of the processes are emphasized. Finishing, decorative techniques, and the role of production tooling; properties, cost factors, and limitations.

Precludes additional credit for Industrial Design 85.210, no longer offered.

Prerequisite: Industrial Design 85.211★.

Day division, Winter term: Lecture and tutorials three hours a week, laboratory three hours a week.

Industrial Design 85.221★

Form and Colour Fundamentals A

The object of this course is to encourage the students to approach the phenomena of form and colour systematically. Known systems of form determination and colour identification are evaluated, as well as the basic elements of design such as: line, colour, value, space, texture, shape and form. Form and colour in nature are compared with form and colour in man-made environments.

Precludes additional credit for Industrial Design 85.220, no longer offered.

Prerequisite: Industrial Design 85.101★.

Day division, Fall term: Lectures and tutorials two hours a week, laboratory four hours a week.

Industrial Design 85.222★

Form and Colour Fundamentals B

This course analyzes further the phenomena of form and colour in industrial design. Properties of structural elements of form and their interactions in ranges, proportions, static and dynamic symmetries in two- and three-dimensional compositions are studied. This includes the principles of design such as balance, unity, contrast, emphasis, pattern, movement and rhythm. Additional topics of the course are the appearance of form and colour under various conditions and in various positions, the expression of form and colour,

typology of objects, form organization, form description and colour specification.

Precludes additional credit for Industrial Design 85.220, no longer offered.

Prerequisite: Industrial Design 85.221★.

Day division, Winter term: Lectures and tutorials two hours a week, laboratory, four hours a week.

Industrial Design 85.231★

Projects IIA

The introductory industrial design projects deal with product development theories in connection with case studies. The laboratory work of this course gives the student an opportunity to apply the experience of Industrial Design 85.131★ in a real product design situation, where an existing product is analyzed, and proposals for improvement and innovation are produced. The emphasis is on the application of visual communication techniques in design.

Precludes additional credit for Industrial Design 85.230★, no longer offered.

Prerequisites: Industrial Design 85.101★, 85.131★.

Day division, Fall term: Lectures and tutorials one hour a week, laboratory six hours a week.

Industrial Design 85.232★

Projects IIB

This course deals with product development theories and practice in connection with the design analysis undertaken in Industrial Design 85.101★. The laboratory work of this course gives the student an opportunity to apply the design process to previously analyzed problem areas. The emphasis is on the creative and executive phases of the design process.

Prerequisite: Industrial Design 85.231★.

Day division, Winter term: Lecture and tutorials one hour a week, laboratory six hours a week.

Industrial Design 85.312★

Graphics Technology and Design

Survey of techniques and processes used in the printing and blockmaking industry and the relationship of these processes to graphic design. Typeface design and the development of type and families of typeface from historical sources. Typefaces as exponents of cultural trends. Basics underlying typography and layout in graphic design. Minor graphic design projects are executed in connection with the lectures.

Prerequisites: Industrial Design 85.221★ and 85.222★.

Industrial Design 85.313★

Package Engineering and Design

Survey of processes and materials used in the packaging industry. Principles of package engineering and design for the transportation and distribution of mass-produced products. Packaging design as integrated in marketing processes; product and brand identification; corporate identity through package design. Minor packaging design projects are executed in connection with the lectures.

Prerequisites: Third-year registration and Industrial Design 85.312★.

Industrial Design 85.321★

Environmental Communication Workshop

It is recognized that the objects of our environment, besides serving their primary usage, are most often used as a medium to communicate man's personal or collective ideas. The design of objects and environments can, to a great extent, be seen in this context, and this course is intended to explain the major mechanics of communication in general and of communication by means of objects in particular. Analyses of objects and environments with

respect to communicative functions are undertaken and experiments are conducted.

Prerequisite: Third-year registration.

Not offered 1990-91.

Industrial Design 85.322★

Advanced Studies in Form and Colour

Students may continue the research and study encountered in Industrial Design 85.221★ and 85.222★ by doing advanced research in some specific area of the phenomena of form and/or colour. Directed study.

Prerequisites: Industrial Design 85.221★ and 85.222★ or permission of the School of Industrial Design.

Industrial Design 85.330

Projects IIIA

The industrial design projects to be accomplished are of a simple nature, based on a given briefing and program of requirements. The emphasis is on the creative and executive phases of the design process.

Prerequisites: Industrial Design 85.231★ and 85.232★ or permission of the School of Industrial Design.

Day division, Fall term: Lectures and tutorials four hours a week, laboratory 12 hours a week.

Course value equivalent to 1.0 credit.

Industrial Design 85.331

Projects IIIB

Industrial design projects IIIB are of a more complex nature and may be accomplished with experts from other disciplines. These projects begin with an extensive period of orientation on the given problem areas from which the program of requirements is derived, which present the criteria for further creative and executive work. The choice of design assignments is made with the consent of the students involved. It is considered to be important that the student is doing a complete job, including the accomplishment of all the sketchwork, the making of preliminary models, product drawings and modelling.

Prerequisite: Industrial Design 85.330.

Day division, Winter term: Lectures and tutorials four hours a week, laboratory 12 hours a week.

Course value equivalent to 1.0 credit.

Industrial Design 85.335★ and 85.336★

Third-Year Special Industrial Design Studies

Special Industrial Design Studies deal with specific projects, which may differ from year to year depending on the availability of specialists in a particular field or study opportunities as they present themselves.

Prerequisite: Third- or Fourth-year registration, or permission of the School of Industrial Design.

Day division, Fall and Winter terms: Lectures, tutorials and laboratory six hours a week.

Industrial Design 85.351★

Colloquium Cultural Subjects A

This colloquium is seen as an opportunity to introduce various cultural subjects by experts from these fields, more specifically, those dealing with the fine and performing arts. The objective is to give the students a sense of context and relevance of industrial design as an integral part of our culture.

Precludes additional credit for Industrial Design 85.350, no longer offered.

Prerequisite: Industrial Design 85.100★.

Day division: Lectures and tutorials three hours a week.

Industrial Design 85.352★

Colloquium Cultural Subjects B

This colloquium is seen as an opportunity to introduce

various cultural subjects which have an influence on contemporary industrial design. The perspective of the colloquium is anthropological and the objective is to give the students a sense of context and relevance of industrial design as an integral part of our culture.

Precludes additional credit for Industrial Design 85.350, no longer offered.

Prerequisite: Industrial Design 85.100★.

Day division: Lectures and tutorials three hours a week.

Industrial Design 85.360★

Anthropometrics and Ergonomics

Concepts of human engineering, anthropometrics and ergonomics are studied, researched and experimentally applied. Special emphasis is given to limits of human performance, visual and tactile displays, man-machine and man-environment interface, measurement, etc.

Prerequisite: Psychology 49.100.

Day division, Fall term: Lectures and discussion two hours a week, laboratory three hours a week.

Industrial Design 85.361★

Anthropometrics and Ergonomics Workshop

Laboratory work and experimentation in anthropometric and ergonomic factors as they affect industrial design.

Prerequisite: Industrial Design 85.360★.

Day division, Winter term: Lectures and discussion two hours a week, laboratory three hours a week.

Industrial Design 85.400★

Professional Practice In Industrial Design

The course surveys how industrial designers practise as independent consultants, and how they are employed in industry. The organizational aspects of independent offices of industrial design, their responsibilities towards their clients and their ways of operation are compared with the role of industrial design and the organizational aspects of the profession within the framework of industrial management. Topics include the form of contracts for industrial design consultancy, ways of determination of fees, legal implications of the profession including those of patents and copyrights. The course also deals with the organization of the profession on a national and an international basis. Representative industrial designers are invited to give their views on professionalism and to present case histories of their operations.

Prerequisite: Industrial Design 85.100★ (Architecture 76.206★).

Day division, Fall term: Lectures and discussion three hours a week.

Industrial Design 85.401★

Industrial Design Seminar

Each year a special topic is chosen to be elaborated on and discussed. The topics deal with problems in the relationship of industrial design to other disciplines or problems regarding the theoretical aspects of industrial design itself.

Prerequisite: Registration in Fourth-year Industrial Design projects.

Industrial Design 85.411★

Advanced Studies In Manufacturing Technology for Industrial Design

Directed study in the field of manufacturing, centred on such topics as: cost analysis, new materials and processes, computer aided manufacturing, numerically controlled machining, machining of moulds, etc.

Prerequisites: Industrial Design 85.211★ and 85.212★ or equivalent.

Industrial Design 85.420★

Form Organization

Form organization attempts to design, define and prescribe solids of monolithic nature by means of an abstract system which can be used for instructional purposes to make and verify materialized approximations of such solids. A three-dimensional locus is an example of such a system; other systems are based on controlled growth patterns, geometric generation, typological generation, etc. The course intends to describe variations of such systems, which the students are required to apply in laboratory exercises.

Prerequisites: Industrial Design 85.221★ and 85.222★ or permission of the School of Industrial Design.

Day division, Fall or Winter term: Lectures, tutorials and laboratory six hours a week.

Industrial Design 85.430 (2 credits)

Major Projects

The major Fourth-year projects should represent a theme from which one or more problem areas can be derived or narrowed down. The problem areas chosen should preferably be product-oriented and be of sufficient complexity. Preferably, the assignment should be undertaken in co-operation with off-campus organizations, industry, etc., to increase the realism of the approach, at the same time introducing the student to practice and placement. Depending on the nature of the assignment, the results of the design work in these major projects may deviate from the usual accomplishments of the executive phase of the process, but they should bear evidence of the student's involvement and thorough approach. See also: Industrial Design Projects, and Fourth-year Industrial Design Projects (p. 336).

Prerequisite: Industrial Design 85.331 or permission of the School of Industrial Design.

Day division: Lectures and tutorials two hours a week, laboratory 14 hours a week.

Course value equivalent to 2.0 credits.

Industrial Design 85.431

Minor Projects A

The minor projects mainly serve to enable students to demonstrate their versatility. The choice of the minor projects, therefore, must be in balance with the major projects. Although preferred, it is not strictly required that the minor projects be product-design oriented, nor need they be derived from actual utilization-problem areas. They could represent research in complementary design fields such as communication, graphic design or design experiments. Although the minor projects may be of a less complex nature than the major projects, they should always conform to academic standards of quality and be handled in the same systematic way and with the same thoroughness as the major projects. See also: Industrial Design Projects, Fourth-year Industrial Design Projects (p. 336).

Prerequisite: Industrial Design 85.331 or permission of the School of Industrial Design.

Day division: Lectures and tutorials two hours a week, laboratory six hours a week.

Industrial Design 85.432

Minor Projects B

See Industrial Design 85.431.

Prerequisite: Industrial Design 85.331 or permission of the School of Industrial Design.

Day division: Lectures and tutorials two hours a week, laboratory six hours a week.

Industrial Design 85.435★ and 85.436★

Fourth-Year Special Industrial Design Studies

Like the Third-year Special Industrial Design Studies, those of Fourth year deal with specific projects, which may differ each year depending on the availability of specialists among the faculty of the School of Industrial Design or on particular opportunities as they present themselves.

Prerequisite: Fourth-year registration or permission of the School of Industrial Design.

Day division, Fall and Winter terms: Lectures, tutorials and laboratory six hours a week.

Industrial Design 85.440★

Industrial Practice Internship Field Reports

During the periods of internship in industry, or in alternative internships approved by the School of Industrial Design, the student is required to study technological phenomena in their relationship to industrial design. At the end of each period, a field report, describing such phenomena and relationships, must be submitted to the School of Industrial Design for evaluation and marking. The quality and quantity of the field reports must minimally reflect a period of internship study of 16 weeks. Copies of field reports will be filed in the School of Industrial Design to be accessible to other students.

Officers of the Faculty

Dean
L.A. Copley

Associate Dean
To be announced

Secretary of the Faculty
J.E. Graham

Registrar
B.R. Lifeso

Directory of Offices, Chairmen and Directors

Office of the Dean
223 Herzberg Physics, 788-4388

Office of the Associate Dean
217 Herzberg Physics, 788-8765

Office of the Registrar
212 Herzberg Physics, 788-4440

Biology, D.R. Gardner, Chairman
583 Tory Building, 788-3888

Chemistry, R.A. Shigeishi, Chairman
203 Steacie Chemistry, 788-3841

Earth Sciences, Chairman to be announced
320 Tory Building, 788-4400

Geography, M.W. Smith, Adviser
B349 Loeb Building, 788-2561

Mathematics and Statistics, C.W.L. Garner, Chairman
712 Dunton Tower, 788-2155

Physics, Chairman to be announced
316 Herzberg Physics, 788-4377

Psychology, R. Zacharko, Adviser
B550 Loeb Building, 788-2644

Institute of Biochemistry
J.M. Neelin, Director

Integrated Science Studies Committee
I.S. Pressman, Chairman

Committee on Combined Programs with Computer Science
M. Atkinson, Chairman

Biotechnology Co-ordinators
J.A. Webb and J.M. Neelin

Biology and Geology
R.T. Patterson, Chairman

Biology and Physical Geography
J.K. Torrance, Chairman

Biology and Psychology
D.R. Gardner, Chairman

Chemistry and Geology
G.Y. Chao, Chairman

Chemistry and Physics
L. Resnick, Chairman

Physical Geography and Geology
J.K. Torrance, Chairman

Geology and Physics
J. Blenkinsop, Chairman

Geology and Statistics
Chairman to be announced

Mathematics and Physics
M. Rahman, Chairman

Committee on Admission and Studies
J.E. Graham, Chairman

Science Technology Centre
A.A. Raffler, Director

General Information

The Faculty of Science includes the Departments of Biology, Chemistry, Earth Sciences, Mathematics and Statistics, and Physics and provides programs leading to the degrees of Bachelor of Science, Bachelor of Science in Environmental Science, Bachelor of Science in Integrated Science Studies and Bachelor of Science with Honours.

The Science degree program is designed to provide specialization in one field of study called the Major field while permitting the candidate to select other courses from complementary fields or disciplines in which he or she has a particular interest. The Major fields include Biology, Chemistry, Computer Mathematics, Geology, Integrated Science Studies, Mathematics, Physics and Statistics, and the corresponding programs are detailed in the departmental sections of the Calendar.

For information about the Environmental Science degree program see p. 379.

For information about the Integrated Science Studies degree program see p. 383.

The Science degree program with Honours is designed for those students who wish to deepen and extend their studies in one particular field or area for the purpose of preparing themselves for graduate studies, or for entrance to the Specialist's Certificate of the Ontario College of Education or other fields of scientific endeavour. Honours may be taken in Biochemistry, Biology, Chemistry, Computer Mathematics, Environmental Science, Geology, Integrated Science Studies, Mathematics, Operations Research, Physical Geography, Physics, Psychology and Statistics. Combined Honours may be taken in Biochemistry and Biotechnology, Biochemistry and Biotechnology (Co-operative Option), Biology and Biotechnology, Biology and Geology, Biology and Physical Geography, Biology and Psychology, Chemistry and Geology, Chemistry and Physics, Computer Science and Mathematics, Physical Geography and Geology, Geology and Physics, Geology and Statistics, Mathematics and Physics, and in Physics and Computer Science. The detailed programs are given in the appropriate departmental sections of the Calendar. The Honours program of each student is under the direct supervision of an Honours adviser of the student's department.

Accelerated Progress

Students registered in Qualifying University year who successfully complete two years or ten credits at the University with a B- or 70 percent average may have their programs assessed for the purpose of reducing the number of credits required to graduate. This reduction may be made for any student registered in the Faculty of Science who satisfies the promotion requirements for First-year Science within one academic year after admission to Qualifying-University-year Science with a grade-point average of not less than 7.0 (B-) over credits taken and with the recommendation of a Major department or interdepartmental program committee.

Admission Requirements

Qualifying-University Year in Science

The Ontario Secondary School Graduation Diploma. A 70 percent average must be presented on a minimum of 10 advanced or enriched phase credits at Levels 3 and 4, including an appropriate preparation in chemistry, physics and level 4 mathematics, or equivalent.

Bachelor of Science, Major Program

First Year

1. The successful completion of five credits approved for a Qualifying-University-year Science program with an average of C- or better in the credits in Mathematics and at least two Experimental Sciences; or
2. The Ontario Secondary School Diploma including six Ontario Academic Courses (OACs) with an average of 60 percent, or the equivalent, including one OAC in calculus, one OAC in algebra and geometry, and two OACs in the experimental sciences; or the Ontario Secondary School Honours Graduation Diploma with a minimum 60 percent average and including functions, calculus and two experimental sciences. Prospective students should note that, while only a 60 percent general average is required for admission, they should have at least 60 percent in the mathematics and science subjects offered. Applicants from outside the province of Ontario must present acceptable equivalent certificates generally required for admission to universities in their own provinces or countries. Applicants should note that in view of limited human and physical resources, meeting the minimum published admission requirements can only establish eligibility for selection to the Faculty of Science.

Advanced Standing

1. To be admitted to Second year a student must have completed the equivalent of the First-year Science program with the required academic standing.
2. Applications for admission to the Third or subsequent years will be evaluated on their merits, and advanced standing granted for studies undertaken elsewhere when these are recognized as the equivalent of subjects offered at Carleton University.
3. Students not admitted to a degree program but taking courses at Carleton University as Special students may, on transfer to a Science degree program, receive credit for not more than seven credits, four of which must meet the First-year promotion requirements.

Bachelor of Science Honours Program

1. (a) A new student desiring admission to Honours in Science should so indicate on the application for admission to undergraduate studies. The student may indicate the Honours program desired, in which case the application will be forwarded by the Admissions Office to the appropriate department or committee for approval. A student who does not wish to indicate the particular program may be admitted to First-year Honours Science. Any such student must elect a particular Honours program before entering Second year. (b) An "in course" student wishing to enter an Honours program must apply to the chairman of the appropriate department or committee through the Science Faculty Registrar's Office.
2. For entry to the First year of an Honours program, a student must have an average of 65 percent or better in the six Ontario Academic Courses (OACs), as listed under the admission requirements for the Major program, or have a grade-point average of 4.0 or better in the courses of Qualifying-University year and the recommendation of the Honours department or committee. For Honours in Psychology, an OAC in English is recommended. Students presenting credits for one or more repeated subjects or courses may not be admitted directly into an Honours program except on the recommendation of the department or committee concerned. Applicants should note that, in view of limited human and physical resources, meeting the minimum published admission requirements can only establish eligibility for selection to the Faculty of Science.
3. For entry to an Honours program after the completion of First year, a student must have a grade-point average of 6.0 or better in the Honours subject(s), an overall grade-point average of 4.0 or better and the recommendation of the Honours department or committee. A student beginning the final five credits towards an Honours degree must present a grade-point average of 6.5 or better in the Honours subject or in each Honours subject and a grade point average of 5.0 or better overall, as calculated for graduation.
4. Students applying for admission to Honours in Science at Carleton after having obtained a degree from Carleton or another university shall meet the same criteria as specified in 2 and 3.
5. No student may be admitted to Honours in Science without satisfying the requirements for entry to the corresponding Major program.
6. While the consent of the department or committee concerned is necessary for entry to an Honours program, the department cannot establish a standard of entrance based on a grade-point average which is higher than that established by the faculty as set out in the foregoing paragraphs. Students who consider that they meet the requirements for entry to an Honours program but who have not been accepted by any department may appeal to the Science Committee on Admission and Studies for review of the case. The Committee will report to the Science Faculty Board on all such appeals. It should be noted, however, that departmental capacities to accept all qualified Honours candidates may be limited by physical resources.
7. Students in the final year of a Major degree program wishing to be considered for entry to an Honours program must apply to the Science Faculty Registrar's Office to have their names withdrawn from the graduation list before March 1 of that year. If subsequently the student is not accepted for an Honours program, the student must reapply for graduation.

Course Requirements

Qualifying-University Year in Science

A Qualifying-University year is offered for students who do not have the equivalent of the Ontario Secondary School Diploma with six Ontario Academic Courses (OACs). It is equivalent to Ontario Grade 13 (Senior Matriculation). The program consists of the following five credits:

1. Mathematics 69.007★ and 69.017★;
2. Two credits selected from Chemistry 65.010, Physics 75.105, Biology 61.102, Geology 67.100 or 67.105;
3. Two other credits selected from any of the foregoing subjects not already presented and from other courses approved for a Qualifying-University-year Science program as follows:
Science: Biology 61.102, Chemistry 65.010, Geology 67.100 or 67.105, Physics 75.105.
Arts or Social Sciences: Any Arts or Social Sciences course for which the student has the required prerequisite.
Computer Science: Any Computer Science course for which the student has the required prerequisite except 95.100★ and 95.101★.

First Year

The First-year program leading to the degree of Bachelor of Science consists of five credits approved for a First-year Science program including:

- (a) two experimental Science credits chosen from two different departments of Biology, Chemistry, Geology or Physics;
- (b) a Science credit chosen from an approved third different experimental Science or approved credits in Mathematics or Computer Science.
- (c) two additional credits chosen from Science, Mathematics, Arts, Social Sciences, (except Interdisciplinary Social Sciences 03.300★), Computer Science (except Computer Science 95.100★ or 95.101★) or Engineering.

Students who have declared a Major or Honours in a Mathematics program in their First year may replace one of the experimental Sciences under (a) by a credit in Computer Science (except Computer Science 95.100★ or 95.101★).

In establishing their First-year program of courses, students should consult with the chairman of their Major department, the chairman of the Environmental Science Committee, the chairman of the Integrated Science Studies Committee, or the chairman of the appropriate interdepartmental committee. Students who have not yet selected a Major field should select those First-year courses that will give them a wide choice of fields for the Second year.

Courses Approved for a First-Year Science Program

Science Courses*Biology*

- 61.102 Introductory Biology; or if this course has been completed prior to First year, with permission:
- 61.201★ Animals: Form and Function
 61.202★ Plants: Form and Function
 61.209★ Evolutionary Biology
 61.214★ Introductory Genetics
 61.220★ Cell Physiology
 61.230★ Microorganisms

Chemistry

- 65.010 Introductory Chemistry
 65.100 General Chemistry; or if this course has been completed prior to First year, with permission:
- 65.210 Physical Chemistry
 65.220 Organic Chemistry
 65.230 Analytical Chemistry
 65.231★ Analytical Chemistry

Computer Science

- 95.102★ Introduction to Computers
 95.103★ Introduction to Scientific Computing
 95.105★ Introduction to Programming
 95.106★ Computer Applications

Geography

- 45.105 Introduction to Geoscience

Geology

- 67.100 Principles of Geology
 67.105 Introduction to Geoscience; or if one of Geology 67.100 or 67.105 has been completed prior to First year, with permission, any two of:
- 67.221★ Crystallography and Optical Mineralogy
 67.222★ Mineralogy
 67.228★ Petrography and Geochemistry of Igneous Rock
 67.233★ Sedimentology and Stratigraphy I
 67.234★ Palaeontology I
 67.281★ Field Geology I
 67.282★ Field Geology II

Mathematics

- 69.107★ Elementary Calculus I
 69.117★ Linear Algebra I
 69.102 Calculus
 69.112 Algebra
 69.201 Intermediate Calculus
 69.202 Intermediate Mathematics
 69.207★ Elementary Calculus II
 69.217★ Linear Algebra II
 69.257★ Introduction to Statistics or any Mathematics course for which the student has the prerequisite.

Physics

- 75.100 Introductory Physics
 75.105 Elementary University Physics, or if one of 75.100 or 75.105 has been completed prior to First year, with permission, any two of:
- 75.211★ Mechanics and Properties of Matter
 75.222★ Wave Motion and Optics
 75.235★ Electricity and Magnetism
 75.236★ Physics of Electrical and Electronic Measurements I

Arts and Social Sciences Courses

Any course available to a First-year Arts or Social Sciences student with the exception of:

- (a) Social Sciences courses as listed on p. 348;
- (b) any Computer Science course (including Interdisciplinary Social Sciences 03.300★);
- (c) any course offered by the Departments in the Faculty of Science. Advanced courses in certain disciplines may be included if the prerequisite has been completed prior to First year; and
- (d) any Engineering course.

Courses for Subsequent Years

Major Program

Candidates will ordinarily take at least ten credits beyond the completion of First year:

- (a) at least four more credits in the Major subject;
- (b) at least two Science credits above the First-year level in a department or departments other than the Major department;
- (c) sufficient electives to meet the program requirement of two Arts or Social Sciences electives and one free elective.

The program of each student is under the direct supervision of a full-time member of the department in which the student takes his or her Major. In several departments most of the more advanced courses will be given, in whole or in part, during the day only. Candidates are advised to consult their Major departments as early as possible to arrange their programs.

Environmental Science Program

For course requirements see p. 379.

Integrated Science Studies Program

For course requirements see p. 383.

Honours Program

Students for a degree with Honours will ordinarily take at least 15 credits beyond the completion of First year. (See Honours admission requirements, p. 345 regarding transfers to the Faculty of Science from other institutions or faculties):

- (a) at least six more credits in the Honours subject;
- (b) at least two Science credits above the First-year level in a department or departments other than the Honours department;
- (c) sufficient electives to meet the program requirements of two Arts or Social Sciences electives and one free elective.

For continuance in an Honours program, the student must maintain a grade-point average of 6.0 or better in the Honours subject(s), an overall grade-point average of 4.0 or better and be recommended by the Honours department or committee. At the beginning of their last five credits students must have:

- (a) a grade-point average of 6.5 or better in the Honours subject or in each Honours subject;
- (b) an overall grade-point average of 5.0 or better;
- (c) a grade of C— or better in at least half of the credits to be credited toward their degree;
- (d) the recommendation of their Honours department or committee. Otherwise the student may not remain in Honours.
- (e) students who have a grade point average of 6.3 or 6.4 in their Honours subject may be allowed to continue at the discretion of the individual Department, Institute or Committee.

Notes:

B.Sc. Combined Honours programs with Computer Science have a higher grade-point average requirement for continuance than that stated above. Please refer to the appropriate departmental section of this Calendar for further details (p. 405 for the Department of Physics or p. 389 for the Department of Mathematics and Statistics.)

The course patterns for each Honours program are detailed individually, and requirements lie within the discretion of the

appropriate department or committee. The student should therefore read the appropriate Calendar instructions and consult the chairman of the appropriate department or committee. Capacities for Honours students will depend on departmental resources and the nature of the program.

Regulations governing Honours essays, theses or special projects are detailed in the departmental sections of this Calendar.

A student who fails to maintain Honours standing may not remain in Honours, and must discuss a new program with the chairman of a department.

Science Continuation Courses

1. All courses offered in the Faculty of Science beyond First year except Biology 61.216★, 61.262★, and 61.393★ and Geology 67.383★.

2. All courses offered in Computer Science except Computer Science 95.100★ and 95.101★. A maximum of two half credits at the 100 level in Computer Science (excluding 95.100★ and 95.101★ completely) may be used as Science Continuation course credits. For students in any program offered by the Department of Mathematics and Statistics, Computer Science courses that are cross-listed with Mathematics courses are not acceptable as Science Continuation courses.

Technology, Society, Environment (TSE) 59.300, 59.350★, 59.401★, 59.402★, 59.403★, 59.404★. (Biology Major and Honours students may use these courses only as free options. Integrated Science Studies students may take these courses as part of their program but may not count them as part of their science sequence.)

Geography 45.210★, 45.211★, 45.302★, 45.303★, 45.307★, 45.309★, 45.311★, 45.312★, 45.315★, 45.318★, 45.319★, 45.400★, 45.402★, 45.411★, 45.412★, 45.413★, 45.414★, 45.415★, 45.417★, 45.418★.

Psychology 49.200, 49.220★, 49.270★, 49.300, 49.320, 49.321★, 49.322★, 49.323★, 49.324★, 49.325★, 49.370, 49.372★, 49.375★, 49.380, 49.401★.

3. All courses offered in the Bachelor of Engineering program beyond First year, subject to the approval of the Faculty of Engineering.

Notes:

1. Computer Science 95.100★ and 95.101★ and Interdisciplinary Social Sciences 03.300★ are not acceptable for credit in the Faculty of Science.

2. The following courses are acceptable only as free electives for Science students: Biology 61.190, 61.192★, 61.216★, 61.262★, 61.393★, Chemistry 65.107, Geology 67.383★, Mathematics 69.141★, 69.142★, 69.185★, Physics 75.190, 75.195, Science 60.100. In addition, Interdisciplinary Social Sciences 03.401★ and 03.402★ are acceptable only as free options and only if Mathematics 69.357★ is not successfully completed.

3. All Science Continuation courses taken outside the Major department must be approved by the student's Major department or committee.

4. Courses counted in the Science sequence of the Integrated Science Studies Program will be determined and approved by the Integrated Science Studies Committee.

5. Biology Major and Honours students should refer to *Notes on Programs* (p. 357) for special Science Continuation course provisions that apply to them.

Social Sciences Courses not Acceptable as Social Sciences Electives

Accounting

All Business courses in Accounting.

Economics

43.220, 43.404★, 43.405★, 43.476★.

Geography

45.105, 45.210★, 45.211★, 45.302★, 45.303★, 45.307★, 45.309★, 45.311★, 45.312★, 45.315★, 45.318★, 45.319★, 45.400★, 45.402★, 45.411★ (Geology 67.415★), 45.412★, 45.413★ (Engineering 82.441★, Geology 67.419★), 45.414★, 45.415★, 45.417★ (Engineering 82.424★, Geology 67.424★), 45.418★.

Interdisciplinary Social Sciences

03.300★.

Psychology

49.200, 49.220★, 49.270★, 49.300, 49.320, 49.321★, 49.322★, 49.323★, 49.324★, 49.325★, 49.370, 49.372★, 49.375★, 49.380, 49.401★.

Sociology

53.370.

Academic Standing

Grading System

Standing in courses will be determined by departments and will be shown by alphabetical grades.

The grades used, with their corresponding grade points, are as follows:

A+	12	B+	9
A	11	B	8
A-	10	B-	7
C+	6	D+	3
C	5	D	2
C-	4	D-	1

Standings to represent special circumstances are as follows:

Aeg

Pass standing granted although absent from final examinations. Aegrotat standing is granted only by the Science Committee on Admission and Studies in response to a student's application which meets the stipulations for examinations.

Aud

Indicates course is not being taken for academic credit.

Ch

Credit granted under Challenge for Credit policy.

F

Failure. No academic credit.

FNS

Failure, but with supplemental privileges withdrawn because of incomplete term work or an unacceptably low mark in the examination. No academic credit.

Wdn

Withdrawn in good standing. No academic credit.

Abs

Failure due to absence from the final examination where the necessary term work has been completed. No supplemental privileges. No academic credit.

Def

Students who are absent from final examinations or who are unable to complete their course work for medical or compassionate reasons may apply to the Science Committee on Admission and Studies for deferred examination privileges.

IP

In Progress

Course Load

The normal course load for a full-time student in the Faculty of Science, during the Fall/Winter session, is the equivalent of five credits. The normal course load for a part-time student, in the Fall/Winter session, is the equivalent of two credits.

Students may register for a maximum of two credits in the Summer session, i.e. two Evening courses, or one Evening and one Day course, or two Day courses.

A student may exceed the normal course load in the Fall/Winter session only with the Registrar's permission, which may be granted if a C average is maintained overall and in the Major field, and if recommended by the Major department. Part-time students may be granted permission if a C average is obtained in a minimum of two credits in the previous session.

Promotion and Failure

Full-time Students

Full-time students in First-year Science, in order not to fail their year in May, must, by then, have passed at least three credits. Students who fail to meet this requirement must apply by June 30 for readmission to the Faculty of Science; students who fail First-year Science for a second time are not eligible to apply for readmission to the Faculty of Science.

To be promoted to the credit system from First year, a full-time Science student must have passed at least four credits including at least three credits in Science. The three credits in Science must include at least one credit in each of two different experimental Sciences. The remaining Science credit may be chosen from an approved different experimental Science or from approved credits in Mathematics or Computer Science. Students who have declared a Major or Honours in a Mathematics program may replace one of the two required experimental Sciences with a credit in Computer Science. In addition, students must obtain grades of C- or better in at least two credits, including at least one credit in their intended Major.

For a student without advanced standing in any First-year courses, these four credits must be selected from those approved for a First-year Science program.

For a student (not repeating First year) with advanced standing in some First-year courses, these four credits must include sufficient courses to complete the First-year Science program; the remainder of the four credits may include courses beyond the First year provided the student has retained credit for the prerequisite First-year courses.

In the Major program one of the grades of C– or better must be in the intended Major subject. In the Integrated Science Studies program, the student must have attained a grade of C– or better in one credit from each of the Science and Non-Science sequences.

This must be accomplished in one calendar year (12-month period) with not more than two credits of Summer courses, supplemental and grade-raising examinations. While in First-year Science, a student may write a maximum of two supplemental and grade-raising examinations (full and/or half credits). The course work of those First-year Science students who almost meet promotion requirements is reviewed by the Dean's Committee on Promotion.

A full-time student who does not meet the requirements of promotion by the end of August examinations will have failed First year.

Part-time Students

To be promoted to the credit system from First year, part-time students must, in the first six credits of final examinations, have passed at least four credits approved for a First-year Science program including at least three credits in Science. The three credits in Science must include at least one credit in each of two different experimental Sciences. The remaining Science credit may be chosen from an approved different experimental Science or approved courses in Mathematics or Computer Science. Students who have declared a Major or Honours in a Mathematics program may replace one of the two required experimental Sciences with a credit in Computer Science. In addition, students must obtain grades of C– or better in at least two credits, including at least one credit in their intended Major. Part-time students who fail more than two full-credit equivalents in succession must apply for readmission to the Faculty of Science.

In the Major program, one of the grades of C– or better must be in the intended Major subject. In the Integrated Science Studies program, the student must have obtained a grade of C– or better in one credit from each of the Science and Non-Science sequences.

All Degree Students

Failed students within the limitations specified above may repeat First year, retaining credit toward their degree (but not toward the completion of First year) for all courses graded C– or better.

A student repeating First year may register only in courses approved for a First-year Science program, but may include two credits beyond the First year provided the student has retained credit for the prerequisite First-year course.

A student who fails First year a second time may not re-enter a degree program in the Faculty of Science.

After promotion to the credit system, the student will accumulate course credits under a pattern approved by the appropriate department or committee.

Supplemental Examination Privileges

While in First-year Science, a student may write a maximum of two supplemental and grade-raising examinations (full and/or half credits).

Major degree students have the privilege of writing supplemental or grade-raising examinations, or repeating or replacing courses, subject to the following restriction: After

admission to the credit system the ratio of total number of (full-course equivalent) examinations to the total number of credits required may not exceed three to two. Students may write a maximum of three supplemental and grade-raising examinations (full and/or half credits) while on the credit system (pro-rated for the number of credits required to complete their degree requirements upon entry to the credit system). In particular, a student who requires ten more credits has the equivalent of at most 15 full-course examinations available to complete his or her program, including, at most, three supplemental and grade-raising examinations.

Honours degree students have the privilege of writing supplemental or grade-raising examinations, or repeating or replacing courses subject to the following restriction: After admission to the credit system, the ratio of total number of (full-course equivalent) examinations to the total number of credits required may not exceed six to five. Students may write a maximum of three supplemental and grade-raising examinations (full and/or half credits) while on the credit system (pro-rated for the number of credits required to complete their degree requirements upon entry to the credit system). In particular, a student who requires 15 more credits has the equivalent of at most 18 full-course examinations available to complete the program, including, at most, three supplemental and grade-raising examinations.

The number of examinations available to a student who transfers from another institution or from another program, will be determined on a pro rata basis and will be specified at the time of admission.

When a student is examined in a course that previously has been declared extra to the degree program, this examination does not affect the remaining number of available examinations.

Students who cannot complete their program without exceeding the available number of examinations forfeit their undergraduate status in the Faculty of Science.

Graduation

General Regulations

1. Every student will be required to complete the last five credits at Carleton University unless authorized by the Faculty of Science to take a maximum of one of these last five credits at the University of Ottawa under the Undergraduate Exchange Agreement.
2. A student who takes courses elsewhere with a Letter of Permission from the Science Committee on Admission and Studies may, with the approval of the appropriate department or committee, use the credit value but not the grades to meet graduation requirements;
3. Students who transfer to the Faculty of Science from another institution must include in the courses presented for degree (whether obtained at Carleton or elsewhere) at least:
 - (a) two credits of Arts or Social Sciences electives if on transfer they received credit for less than ten credits;
 - (b) one credit of Arts or Social Sciences electives if on transfer they received credit for ten or more credits.

Note:

See also University graduation regulations, pp. 38-39.

Major Degree Students

To qualify for graduation students must:

1. present credits for 15 approved full courses (or equivalent) beyond Qualifying-University year with not more than two credits below the 100 level and not more than seven below the 200 level;
2. have a grade of C- or better in at least half of the 15 credits;
3. have an average of C- or better in the credits in their Major subject or subjects;
4. after entry to the credit system, have completed the program with not more than three (full-course equivalent) examinations for every two credits required. (Examinations include supplemental and grade-raising examinations, course repetitions and replacements, and can include, at most, three supplemental and grade-raising examinations.) Part-time students or full-time students who have interrupted their studies must complete the program within seven years after entry to courses beyond First year;
5. include at least two credits in the Major subject or subjects in the last five credits taken for credit;
6. be recommended by the Major department(s) and the Science Faculty Board (see general regulation 3).

To meet the requirements for the C- average in the Major stated above, only those credits in the Major necessary to make up the required total for graduation in the Major department need be counted. All obligatory courses must be counted.

Graduating students in a Major program of the Faculty of Science will be designated as graduating "with Distinction" if:

1. they have no course failures, course repetitions, course replacements or grade-raising examinations on their Carleton record after promotion to the course-credit system;
2. they have achieved an overall grade-point average of 8.0 or better calculated on their Carleton record, including all credits extra to the degree;
3. they have successfully completed at Carleton at least ten credits counted toward the degree;
4. after promotion to the course-credit system, they have achieved a grade-point average of 9.5 or better calculated on all Carleton credits being counted toward the degree.

Integrated Science Studies Degree Students

See p. 381.

Honours Degree Students

To qualify for graduation with a Bachelor of Science degree with Honours a student must:

1. present credits for at least 20 credits of approved full courses (or equivalent) beyond Qualifying-University year, with not more than two credits below the 100 level and not more than seven below the 200 level;
2. meet the requirements of the Faculty of Science and of the appropriate department or committee with respect to both course and grade requirements;
3. after entry to the credit system, have completed the program with not more than six (full course equivalent) examinations for every five credits required. (Examinations include supplemental and grade-raising examinations, course repetitions and replacements, and can include, at most, three supplemental and grade-raising examinations.)

A part-time student or a full-time student who has interrupted his or her studies must complete the program within seven years after entry to courses beyond First year;

4. include at least two credits in the Honours subject or subjects in the last five credits taken;
5. be recommended by the appropriate department or committee and the Science Faculty Board.

The Honours degree will not be awarded to students taking fewer than five credits at Carleton.

Designations of Honours Degrees

Three designations of Honours are awarded, determined on the basis of the grade-point average as follows:

Highest Honours

10.0 — 12.0 in Honours subject, and
8.0 or better overall

High Honours

9.0 or better in Honours subject, and
7.0 or better overall

Honours

6.5 or better in Honours subject, and
5.0 or better overall

Departments may recommend the higher designation of Honours degree in the case of a student one of whose indices is in the appropriate higher range and the other within 0.2 grade points of the higher range.

To determine the class of degree for students with Combined Honours, the average is computed on the basis of the weighted average of the required number of Honours credits in the two subjects. If agreeable to the committee concerned, the average may be taken in each of the two subjects and the simple average of the two may be used.

Departments may use discretion for establishing the class of degree in counting the number of Honours credits where students have more than the minimum number of credits.

Students admitted to an Honours program prior to September, 1980, may have the following designations of classes of Honours shown on their degrees and determined on the basis of the grade-point average indicated:

First Class

9.0 - 12.0 in Honours subject, and
7.0 or better overall

High Second Class

8.0 or better in Honours subject, and
6.0 or better overall

Second Class

6.0 or better in Honours subject, and
4.0 or better overall

Students admitted to an Honours program prior to March, 1977, may have the following designations of classes of Honours shown on their degrees and determined on the basis of the grade-point average indicated:

First Class

9.0 - 12.0 in Honours subject, and
6.0 or better overall

High Second Class

8.0 or better in Honours subject, and
5.0 or better overall

Second Class

6.0 or better in Honours subject, and
4.0 or better overall

In addition, students admitted to an Honours program prior to September, 1977, may be awarded an Honours degree with *Third Class* Honours based on a grade-point average of 4.0 or better in the Honours subject and 3.6 or better overall.

Physics

75.190 Introduction to Astronomy
75.195 Physics of Music

Science

60.100 Man in His Environment

Academic Clubs and Societies

The following clubs and societies operating on the campus serve to broaden and enrich the curriculum, and to offer students social activity and friendship related to their intellectual interests. The societies listed here are particularly pertinent for students registered in the Faculty of Science.

The Biology Society sponsors academic and social events, promotes informal contact between students and faculty, and helps acquaint students with on-going biological research.

The Canadian Society for Chemistry, through its Carleton University Student Chapter, is active in sponsoring a number of professional and social activities throughout the year.

The Geology Society sponsors lectures on geological topics, and organizes field trips and social events for all undergraduate students with an interest in geology.

CMASS, the Carleton Mathematics and Statistics Society, features "Naive-Level Seminars" designed by and for mathematics undergraduates. The society office promotes contact between students at different stages in their studies. Faculty Adviser: Cyril Garner.

Carleton's *High School Mathematics Club* organizes evening meetings of films, lectures, workshops and problem sessions for local high school students seriously interested in mathematics. Faculty co-ordinator: John Poland.

The Physics Society sponsors visits to government and industrial laboratories in the Ottawa area, arranges special lectures on physics topics and social events for those interested in physics.

Science Courses without Prerequisites and Recommended to Students in Other Faculties

Biology

61.102 Introductory Biology
61.190 Biology and Man
61.192★ Natural History
61.262★ Ecology in Architecture
61.393★ Biology and Development of Renewable Resources

Chemistry

65.107 The Chemistry of Art and Artifacts

Geology

67.100 Principles of Geology
67.105 Introduction to Geoscience

Mathematics

69.141★ Gambling I

Tory Building, Room 522
Telephone: 788-3860

Officers of Instruction

Director
J.M. Neelin

Professors
J.M. Neelin
K.B. Storey
C.S. Tsai
H. Yamazaki

Members of the Institute

Members

J.W. ApSimon (*Chemistry*)
P. Buist (*Chemistry*)
D.R. Gardner (*Biology*)
B. Hollebone (*Chemistry*)
V.N. Iyer (*Biology*)
K.W. Joy (*Biology*)
J.M. Neelin (*Biology*)
J. Sinclair (*Biology*)
K.B. Storey (*Chemistry and Biology*)
C.S. Tsai (*Chemistry*)
J.A. Webb (*Biology*)
D.C. Wigfield (*Chemistry*)
F. Wightman (*Biology*)
R.H. Wightman (*Chemistry*)
R.C. Wyndham (*Biology*)
H. Yamazaki (*Biology*)

Associate Members

S.A. Narang (*Adjunct Professor of Chemistry*)
V.L. Seligy (*Adjunct Professor of Biology*)
I.C.P. Smith (*Adjunct Professor of Chemistry*)

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 349-350), in addition to all regulations and requirements of the Institute as set out below.

Honours Program

Honours Bachelor of Science in Biochemistry and Biotechnology

See description of this special program on p. 364.

Honours Bachelor of Science in Biochemistry

The Institute of Biochemistry offers a four-year program leading to an Honours B.Sc. in Biochemistry, intended to provide a broad basic training for students planning a career in a biochemical field. Several courses in Biology and Chemistry (and resources from these departments) are integrated into the program to provide the background that is fundamental to an understanding of the biochemistry of animals, microorganisms and plants.

Students entering the program must satisfy the general requirements for B.Sc. Honours (p. 345). The following 20 credits are required, taken in a pattern approved by the Director of the Institute:

1. Biology 61.209★ (unless Biology 61.102 is offered in lieu of the Ontario Academic Course in Biology, see 7 below), 61.230★, 61.214★, 61.314★, 61.325★, 61.335★ and one credit selected from approved 300-400 level Biology courses;
2. Chemistry 65.100, 65.210, 65.220, 65.231★, 65.321★, 65.322★, 65.325★;
3. (a) Biochemistry 63.310 and 63.305★;
(b) Biochemistry 63.401★, 63.402★, and 63.498;
(c) At least one of Biochemistry 63.403★ and 63.404★;
4. Physics 75.100 or 75.105, Mathematics 69.107★, 69.117★ and at least one Mathematics half credit at the 200 level;
5. Two approved Arts or Social Science credits;
6. One and one-half credits, chosen in consultation, and related to the student's area of specialization. Some recommended courses include: Biochemistry 63.403★, 63.404★, Biology 61.321★, 61.330★, 61.351★, 61.392★, 61.416★, 61.419★, 61.423, 61.424, 61.426★, 61.427★, 61.428★, 61.429★, 61.435, 61.455, Chemistry 65.311★, 65.312★, 65.353★, 65.354★, 65.420★, 65.422★, 65.423★, Physics 75.235★, 75.236★, Mathematics 69.207★, 69.208★, 69.217★, 69.257★ or 69.250, Computer Science 95.103★;
7. One free option credit (one half free option credit if Biology 61.102 is offered in lieu of the Ontario Academic Credit in Biology, see 1 above).

Notes:

1. For students already in a Carleton degree program, a completed credit for Biology 61.100 or 61.101 (no longer offered) will replace the requirement for Biology 61.209★ and 61.230★.
2. For the purposes of calculation, the "Honours subjects" include all Biochemistry courses, plus the Biology and Chemistry courses listed in items 1 and 2 above.
3. In choosing a program, students should consider the prerequisites required for any courses that they wish to take in later years.
4. Credit will not be given for Biology 61.220★ taken after Biochemistry 63.310 or equivalent.

Graduate Program

No graduate program is offered by the Institute but the graduate offerings of the Departments of Biology and Chemistry include projects and courses that may be appropriate for students with an interest in biochemistry. Details are found in the Graduate Studies and Research Calendar.

Courses Offered

Biochemistry 63.305★

Practical Biochemistry

A laboratory and tutorial course introducing the basics of experimental biochemistry and illustrating the theory and concepts dealt with in Biochemistry 63.310.

Prerequisites: Chemistry 65.220 or 65.222; Chemistry 65.210 or Biology 61.220★. Biochemistry 63.310 or equivalent is recommended as a co-requisite.

Day division, Both terms: Four hours a week plus biweekly assignments.

Biochemistry 63.310

General Biochemistry

Chemistry and metabolism of proteins, lipids, carbohydrates and nucleic acids. Mechanism of action of enzymes. Metabolic control mechanisms and inter-relations. Biological oxidation. Biosynthesis of structural, storage and informational compounds.

Prerequisites: Chemistry 65.220 or 65.222; Chemistry 65.210 or Biology 61.220★.

Day division: Three lectures a week.

Biochemistry 63.401★

Methods in Biochemistry

The course deals with the principles and applications of modern biochemical methodology, including use of radioisotope tracers, ultracentrifugation, electrophoresis and ion-exchange chromatography.

Prerequisite: Biochemistry 63.305★ or 63.310.

Day division, Fall term: Lectures and discussion two hours, laboratory hours reduced from six to five.

Biochemistry 63.402★

Biomacromolecules

Biochemistry of polysaccharides, proteins and nucleic acids. Discussion of experimental approaches to purification and conformational studies of biomacromolecules, their interaction in solutions, function and regulation of enzymes. Workshop sessions include discussion of experimental design and interpretation, and solving of related numerical problems.

Prerequisite: Biochemistry 63.310.

Day division, Winter term: Lectures two hours, workshop two hours a week.

Biochemistry 63.403★

Metabolic Regulation

The course includes discussion of topics concerned with the regulation of intermediary metabolism.

Prerequisite: Biochemistry 63.310.

Day division, Fall term: Lectures three hours a week.

Biochemistry 63.404★

Industrial Biochemistry

A course illustrating the application of biochemistry to the production of biological compounds useful in nutrition, medicine, and the food and chemical industries. The course also reviews the general strategies for efficient production of these compounds by controlling the activities of living cells or enzymes.

Prerequisite: Biochemistry 63.310 or permission of the Institute.

Day division, Winter term: Lectures three hours a week.

Biochemistry 63.490

Co-operative Project in Biotechnology

A practical one-year working experience in aspects of biotechnology to be carried out off-campus. A report must be submitted to the Institute of Biochemistry upon completion of the project. This course will be graded satisfactory (*Sat*) or unsatisfactory (*Uns*).

Prerequisite: Permission of the Institute.

Biochemistry 63.491★

Selected Topics in Biochemistry

Selected topics of current interest in biochemistry are of-

fered upon approval by the Director in consultation with members of the Institute.

Day division.

Biochemistry 63.498

Research Project

Students carry out a research project approved by the Director, under the supervision of a faculty member, in either the Biology or Chemistry departments. A report must be submitted to the supervisor by the last day of classes, and will be examined by a committee. Extension to the deadline will be allowed only with the permission of the Institute under exceptional circumstances.

Day division: Laboratory and associated work average at least eight hours a week.

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M.J. Canny
W.A. Keller (*Agriculture Canada*)
L. Lefkovich (*Agriculture Canada*)
L. Masner (*Agriculture Canada*)
B.L.A. Miki (*Agriculture Canada*)
S.A. Narang (*National Research Council*)
V.L. Seligy (*National Research Council*)
D.M. Wood (*Agriculture Canada*)

Co-ordinator, Natural History Centre, I.L. Bayly
Curator of Zoology Museum, D.A. Smith
Manager, Greenhouses, H. Datema

General Information

Students intending to Major in Biology are strongly advised

to acquire a good background in chemistry and physics as well as mathematics at the Grade 13 or equivalent level.

Undergraduate Programs

The Department of Biology offers both Honours and Major programs leading to either a B.Sc. or a B.A. in Biology. Students enrolled in any of these programs must arrange their courses in consultation with the Chairman or Associate Chairman (Undergraduate Studies) of the Department, in one of the patterns outlined below. None of the courses in the Department of Biology are available by means of Challenge for Credit.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 349-350, Faculty of Science and pp. 65-66, Faculties of Arts and Social Sciences), in addition to all departmental regulations and requirements as set out below.

For Biology Honours students, the Honours grade-point average is calculated on the basis of all Biology courses taken by a student during his or her degree program. For students in Biology Combined Honours programs, their Honours grade-point average will be calculated on the basis of all required credits in the two Major subjects as stated in the respective program requirements.

Major Programs

Bachelor of Science in Biology

The Bachelor of Science program in Biology recognizes the strong dependence of most modern biology on the physical sciences and mathematics. It treats biology as a unified subject based on common principles and qualities expressed in diverse ways by different organisms. The Major program is not primarily regarded as professional preparation by itself, but its aim is to provide a strong base in concepts and basic facts which should be adaptable to changing demands and needs in modern society. Students enrolled for a Bachelor of Science degree with a Major in Biology must satisfy the general requirements for Science stated on pp. 346-348 and take the following 15 credits in a pattern approved by the Chairman or the Associate Chairman:

Students with the Ontario Academic Course or Ontario Grade 13 in Biology may enter prescribed 200-level courses directly. The recommended course pattern is shown in Chart I, p. 356. It is important that students enrol in courses in the recommended sequence to ensure that subsequent prerequisites are met. The program can be summarized as follows:

1. Six Biology credits to include Biology 61.201★, 61.202★, 61.209★, 61.214★, 61.220★, 61.230★, 61.321★, 61.325★, 61.335★, 61.360★, and one option credit;
2. Chemistry 65.100, Physics 75.100 or 75.105, Mathematics 69.107★ and 69.117★ or equivalent;
3. Two additional Science credits above the 100 level and not in Biology;
4. One additional Science credit;

5. Two approved credits offered by the Faculties of Arts or Social Sciences;
6. One free-option credit.

Students *without* the Ontario Academic Course or Ontario Grade 13 in Biology must first enrol in Biology 61.102 (Introductory Biology). The recommended course pattern is shown in Chart II, p. 356. It is important that students enrol in courses in the recommended sequence to ensure that subsequent prerequisites are met. The program can be summarized as follows:

1. Seven Biology credits to include Biology 61.102, 61.201★, 61.202★, 61.209★, 61.214★, 61.220★, 61.230★, 61.321★, 61.325★, 61.335★, 61.360★, and one option credit;
2. Chemistry 65.100, Physics 75.100 or 75.105, Mathematics 69.107★ and 69.117★ or equivalent;
3. Two additional Science credits above the 100 level and not in Biology;
4. Two approved credits offered by the Faculties of Arts or Social Sciences;
5. One free-option credit.

Bachelor of Arts in Biology

Students enrolled for a Bachelor of Arts degree with a Major in Biology must satisfy the general requirements of the Faculties of Arts and Social Sciences stated on pp. 56-66 and must maintain at least a C- average in Biology courses. The student will follow either the Pass program or Combined Pass program described on p. 75. In either case the approval of the Chairman or Associate Chairman of the Department of Biology is required. For the Combined Pass program, the student should also consult with the department of the other Major subject.

Honours Programs

Honours Bachelor of Science in Biology

The Honours program in Biology is primarily intended for students planning a professional career in research, teaching or administration in biology, or in one of the fields of applied biology, such as the health sciences, agriculture or environmental science. An Honours degree is usually essential for admission to graduate studies. Students planning such a career are strongly advised to enter the Honours program as early as possible, certainly by the end of the Second year. Students must complete the programs shown in either Charts I or II (see p. 356) and satisfy the general requirements for Honours stated on p. 345 and take the following 20 credits in a pattern approved by the Chairman or Associate Chairman. (This allows specialization in such biological subdivisions as ecology, behaviour, cell and molecular biology, genetics, plant or animal physiology, and systematics.)

1. Seven† Biology credits to include Biology 61.201★, 61.202★, 61.209★, 61.214★, 61.220★, 61.230★, 61.321★, 61.325★, 61.335★, 61.360★, one option credit, and 61.498 (†Eight Biology credits if Biology 61.102 is included in lieu of the Ontario Academic Course in Biology), (see Major Programs above);
2. Chemistry 65.100, Physics 75.100 or 75.105, Mathematics 69.107★ and 69.117★ or equivalent;
3. Two additional Science credits above the 100 level and not in Biology;

4. One additional credit, chosen in consultation, related to the student's area of specialization unless Biology 61.102 is offered in lieu of the Ontario Academic Course in Biology (see above);

5. Four advanced Science credits, selected in consultation with a faculty member working in the area of specialization chosen by the student;
6. Two approved credits offered by the Faculties of Arts or Social Sciences;
7. One free-option credit.

Fourth-year students are strongly urged to attend the departmental research seminars.

Areas of Specialization

Students should choose their Biology option credits at the 300 and 400 level so that they can develop an area of specialization according to their preferred area of biology. Possible areas of specialization include molecular or cellular biology, plant or animal physiology, animal behaviour or ecology, and systematics. Note that 400-level courses can be taken by Biology Majors in their Third year of study, provided the appropriate prerequisites are met.

Courses should be chosen in consultation with the Chairman or Associate Chairman or a faculty member working in an area close to the interest of the student. This consultation should preferably begin before entering the Third year, to ensure that courses that may be given only in alternate years are taken in the correct sequence. In any case, students must consult the Chairman or Associate Chairman before registering in the Fourth year.

Biology 61.314★ is strongly recommended as an option for all Biology students with interests in molecular and cell biology, plant or animal physiology, and biotechnology.

Biology 61.361★ is strongly recommended for students in ecology, animal behaviour and systematics.

Honours in Biology and Biotechnology

See pp. 364-365.

Combined Honours in Biology and Physical Geography

Students desiring a comprehensive basic education in both biology and physical geography may apply for admission to a Combined Honours B.Sc. program. Applicants must satisfy entry requirements of the Honours B.Sc. program.

Course requirements of the Combined Honours B.Sc. program are 20 courses including:

1. Biology 61.209★ and 61.230★, Geography 45.105, Mathematics 69.107★ and 69.117★, Chemistry 65.100;
2. Two optional credits, which are acceptable courses offered by the Faculties of Arts or Social Sciences. A credit in Geography, other than the Physical Geography courses listed on p. 381, is recommended;
3. One additional Science credit from the list on p. 347 (Physics 75.100 or 75.105 is required unless Grade 13 Physics is presented as an entrance credit);
4. One free option credit (unless Biology 61.102 is offered in lieu of the Ontario Academic Course in Biology. See Charts I and II p. 356 for Biology requirements upon entry with and without Ontario Academic Course in Biology);
5. Ten credits in Biology (or Biochemistry) and Physical Geography (see courses listed on pp. 364-365) beyond First-year level, including at least one half credit involving

Chart I
B.Sc. Student with Ontario Academic Course in Biology
(Suggested Pattern)

Program		Year					Term
First	F	Evolution (61.209★)	Math. 69.107★	Chem. 65.100	Physics 75.100 or 75.105	Arts Option	
	W	Microorganisms (61.230★)	Math. 69.117★				
Second	F	Plant Biol. (61.202★)	Cell Physiol. (61.220★)	Genetics (61.214★) Biology Option★	Non-Biology Adv. Sci. Option	Arts Option	
	W	Animal Biol. (61.201★)	Cell Biology (61.321★)				
Third	F	Ecology (61.360★)	Animal Physiol. (61.335★)	Non-Biology Adv. Sci. Option	Science Option	Free Option	
	W	Biol. Option★	Plant Physiol. (61.325★)				

Chart II
B.Sc. Students without Ontario Academic Course in Biology
(Suggested Pattern)

Program Year	Term					
First	F	Intro Biol. (61.102)	Math. 69.107 ★	Chem. 65.100	Physics 75.100 or 75.105	Arts Option
	W		Microorganisms (61.230 ★)			
Second	F	Evolution (61.209 ★)	Cell Physiol. (61.220 ★)	Plant Biol. (61.202 ★)	Non-Biology Adv. Sci. Option	Arts Option
	W	Animal Biol. (61.201 ★)	Biol. Option ★	Math. 69.117 ★		
Third	F	Ecology (61.360 ★)	Animal Physiol. (61.335 ★)	Genetics (61.214 ★)	Free Option ★	Non-Biology Adv. Sci. Option
	W	Cell Biology (61.321 ★)	Plant Physiol. (61.325 ★)	Biol. Option ★	Free Option ★	

a field course. Not more than six credits in this group should be taken in one department and not more than six may be at the 200 level.

6. One additional credit in Science or Computer Science above the 100 level, not in Biology or Geography and chosen in consultation with the student's program adviser.
7. Biology 61.498 or Geography 45.496.

Combined Honours in Biology and Geology

Students desiring a comprehensive basic training in both biology and geology may apply for admission to a Combined Honours program, on completion of the First year of the Science program. Applicants must be of Honours standing and must have achieved grades of C+ or better in both Biology 61.102 (or 61.209★ and 61.230★) and Geology 67.100.

Course requirements of the Combined Honours program are as follows:

1. Biology 61.209★ and 61.230★ for students with the Ontario Academic Course in Biology (61.102 if students do not have the Ontario Academic Course in Biology), Geology 67.100, Mathematics 69.107★ and 69.117★. One of Chemistry 65.100, Physics 75.100 or 75.105. (The omitted subject, i.e. chemistry or physics, must have been taken at the Grade 13 level.)
2. Ten credits in Biology (or Biochemistry) and Geology beyond First-year level, including at least one half-credit field course. Not more than six credits in this group should be taken in one department and not more than six may be at the 200 level.
3. Biology 61.498 or Geology 67.498.
4. One half-credit in Statistics (Mathematics 69.257★ is recommended) and one half-credit in Computer Science (Computer Science 95.103★ is recommended).
5. Three optional credits, at least two of which must be acceptable credits offered by the Faculties of Arts or Social Sciences.
6. A Science elective credit.
7. A language requirement must be met during the Third year by obtaining a credit in, or demonstrating reading proficiency in one of French, German, Russian, Spanish, Italian, Latin, Greek, or any language acceptable to the committee and in which suitable arrangements can be made for the examination.

Combined Bachelor of Science Honours in Biology and Psychology

Students desiring a comprehensive basic education in the neurosciences may apply for admission to this Combined Honours B.Sc. program. Applicants must satisfy entry requirements of the Honours B.Sc. program.

Course requirements of the Combined Honours B.Sc. program are 20 credits, as follows:

First Year

Biology 61.209★ and 61.230★;
Psychology 49.100 as a Social Science elective;
Mathematics 69.107★ and 69.117★;
Chemistry 65.100;
Physics 75.100 or 75.105.

Second Year

Psychology 49.200;
Psychology 49.220★ and 49.270★;
Biology 61.201★ and 61.220★;

One credit from Arts or Social Sciences other than Psychology;
Chemistry 65.220.

Third Year

One credit from Psychology Science Continuation courses;
One of Psychology 49.320 or 49.370 Honours Seminars;
Mathematics 69.257★ and 69.259★ (Psychology 49.300 may be substituted);
Biology 61.335★ and 61.214★;
One Biology or Biochemistry option.

Fourth Year

Psychology 49.498 or Biology 61.498 in neurophysiology, animal behaviour, neuropsychology or related topic;
One credit from Psychology Science Continuation courses;
Biology 61.435 or equivalent;
One advanced credit in Biology;
One free option (unless Biology 61.102 is offered in lieu of the Ontario Academic Course in Biology).

Honours Bachelor of Arts in Biology

Students enrolled for the Honours Bachelor of Arts degree must satisfy the general requirements of the Faculties of Arts and Social Sciences stated on pp. 56-66 and must maintain at least C+ average in Biology courses and a C- average overall. The student will follow either the Honours program or the Combined Honours program described on pp. 76-77. In either case, the approval of the Chairman or the Associate Chairman of the Department of Biology is required. For the Combined Honours program, the student should also consult the other Major department.

Second-year students in the Honours B.A. program are strongly advised to consult with the Biology Department regarding their choice of courses if they wish to take the Honours Research Project, Biology 61.498.

Notes on Programs

For students already in a Carleton degree program, note that a completed credit for Biology 61.100 or 61.101 (no longer offered) will replace the requirement for Biology 61.209★ and 61.230★.

It is important to take Biology 61.220★ in Second year; it is a critical prerequisite for other courses.

Students who do not meet the prerequisites or co-requisites for Physics 75.100 may substitute Physics 75.105 in its place, but it should be noted that Physics 75.100 is preferred as preparation for Biology 61.351★, 61.335★ and 61.435.

Students who have taken Mathematics 69.106★ (no longer offered) may use it as a free option or a 100-level Science option.

In choosing additional Science courses above the 100 level and not in Biology, students may select from the Science Continuation courses listed on p. 347. In their selections, recent Biology students have favoured Biochemistry 63.310, 63.305★, 63.401★, 63.402★, 63.403★, 63.404★; Chemistry 65.210, 65.220, 65.320; Geology 67.233★, 67.234★; Mathematics 69.250, 69.257★; Computer Science 95.103★; Geography 45.210, 45.308, 45.345; Psychology 49.220★, 49.221★, 49.270★. In addition, Chemistry 65.371★, Mathematics 69.207★, 69.208★, Physics 75.230, 75.291★, 75.292★ are suggested for some students. Biology Major and Honours students (except students in the B.A., B.A. Combined Major, B.A.

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Honours and B.A. Combined Honours programs) may use Technology, Society, Environment 59.300, 59.401★ or 59.402★ in fulfilling the degree requirements, but only as a free option.

Graduate Program

The Department of Biology offers programs of study and research leading to M.Sc. and Ph.D. degrees in molecular, cellular and developmental biology, plant and animal physiology, ecology and systematics. Details will be found in the Graduate Studies and Research Calendar.

Courses Offered

Note:

Students should note that Biology 61.102, 61.209★, and 61.230★ are intended primarily for students wishing to major in Biology or take a Science degree. Other students who wish to take a single Biology course should consider Biology 61.190, 61.192★ or 61.216★.

Biology 61.102

Introductory Biology

A lecture and laboratory course for students with little or no background in biology. The course provides an introduction to principles of biological science and includes various aspects of cell biology, metabolism, and genetics, and the evolution, structure, function and ecology of living organisms. The course is designed for students who have not completed Grade 13 Biology or the Ontario Academic Course in Biology, or equivalent.

Precludes additional credit for Biology 61.100 (no longer offered), 61.101 (no longer offered), 61.190, 61.192★ and 61.216★.

Day division: Lectures three hours a week (Fall and Winter terms), laboratory three hours a week (Fall term only). Biology Majors without the Ontario Academic Course in Biology should take this course in their First year of study. It is recommended that Biology 61.230★ also be taken in the First year of study (see Chart II, p. 356).

S.L. Jacobson, J.A. Webb

Biology 61.190

Biology and Man

A course for non-Biology Majors covering major biological concepts that bear directly on human culture, experience and the quality of life. Typically, topics are drawn from areas such as heredity, growth and reproduction, nutrition, evolution and ecology.

Precludes additional credits for Biology 61.100, 61.101 or 61.102.

Not acceptable for credit in a Biology program; acceptable only as a free elective in other Science programs.

Not offered 1990-91.

Biology 61.192★

Natural History

A course designed for non-Biology Majors to investigate the natural history of plants and animals, and the communities in which they occur. Particular attention is paid to the Ottawa region, but appropriate examples from other locales are also included.

Not acceptable for credit in a Biology program; acceptable only as a free elective in other Science programs.

Day division, Winter term: Lectures three hours a week.

M. Runtz

Biology 61.201★

Animals: Form and Function

An investigation of invertebrates and vertebrates to relate their structure, function, behaviour and interactions with plants.

Precludes additional credit for Biology 61.200 (no longer offered).

Prerequisite: Biology 61.102 or 61.230★ or permission of the Department.

Day division, Winter term: Lectures three hours a week, laboratory four hours a week.

H. Damman

Biology 61.202★

Plants: Form and Function

An introduction to the structure and development of higher plants (at molecular, cellular and organism levels) discussed in relation to their function.

Precludes additional credit for Biology 61.200 (no longer offered).

Prerequisite: Biology 61.102 or 61.230★ or permission of the Department.

Day division, Fall term: Lectures three hours a week, laboratory four hours a week.

J.A. Webb

Biology 61.209★

Evolutionary Biology

A lecture course to introduce evolution as a unifying concept in the life sciences. The course includes historical and philosophical perspectives of evolution, with detailed examples selected from molecular, biochemical, cell, tissue, organ, species and population levels of biology.

Precludes additional credit for Biology 61.100 or 61.101 (no longer offered).

Prerequisite: Ontario Academic Course in Biology (or equivalent) or Biology 61.102.

Day division, Fall term: Lectures three hours a week. Biology Majors with the Ontario Academic Course in Biology should take this course in their First year of study (see Charts p. 356).

Co-ordinator: S.B. Peck

Biology 61.214★

Introductory Genetics

A lecture and laboratory course on the mechanisms of inheritance and the nature of gene structure, composition and function. It introduces both classical Mendelian genetics and modern molecular genetics.

Precludes additional credit for Biology 61.216★ or Biology 61.215 (no longer offered).

Prerequisites: Biology 61.230★ or permission of the Department.

Day division, Fall term: Lectures three hours a week, laboratory four hours a week. It is strongly recommended that this course be taken by Biology Majors in their Second year of study (see Charts I or II, p. 356).

G.R. Carmody

Biology 61.216★

Human Genetics and Evolution

A course designed for non-Science Majors which develops the central concepts of genetics and evolution, using, wherever possible, examples drawn from studies of humans. Topics covered include: human reproduction and cell division; chromosomes; autosomal inheritance; sex and sex-linked inheritance; molecular basis of genes and gene function; mutation; genetic diseases; genetic en-

geneering; genes, environment and behaviour; genes in populations; mechanisms of evolution; race; human evolution.

Not a Science continuation course. Available to students in a Biology or other Science program only as free elective, but credit will not be given for Biology 61.216★ if taken after 61.214★.

Prerequisite: A general biology course at the Grade 13 level or above or Psychology 49.100.

Day division, Fall term: Lectures three hours a week.

J. Sampson

Biology 61.220★

Cell Physiology

A lecture and laboratory course on cellular functions and their inter-relationships. It introduces topics including thermodynamics, membrane structure and function, transport mechanisms, basic metabolic pathways, energy production and utilization, communications between cells.

Prerequisite: Biology 61.230★ or permission of the Department.

Day division, Fall term: Lectures three hours a week, laboratory four hours a week. It is strongly recommended that this course be taken by Biology Majors in their Second year of study (see Charts I and II, p. 356).

J. Sinclair

Biology 61.230★

Microorganisms

A lecture and laboratory course introducing these important organisms (particularly bacteria and fungi), and illustrating some fundamental biological concepts. Topics include: the diversity of prokaryotes and microscopic eukaryotes, their structure, reproduction and metabolism, importance in the biosphere, relation to humans, and exploitation in biotechnology.

Precludes additional credit for Biology 61.100, 61.101 and 61.330★ (not offered after 1987-88).

Prerequisite: Ontario Academic Course in Biology (or equivalent) or concurrent registration in Biology 61.102.

Day division, Winter term: Lectures three hours a week, laboratory three hours a week. Biology Majors should take this course in their First year of study (see Charts I or II, p. 356).

Co-ordinator: R.C. Wyndham

Biology 61.262★

Ecology in Architecture

A course stressing ecological principles relevant to the practice of architecture, the relationship of the environment to architectural problems and the unity of the ecosystem with respect to the human condition.

Not a Science continuation course. Not acceptable for credit in a Biology program, but acceptable as a free elective in other Science programs.

Not offered 1990-91.

Biology 61.305★

Invertebrate Zoology

A course devoted to the study of invertebrate structure, physiology, ecology and behaviour.

Prerequisite: Biology 61.201★. Note: This course is a prerequisite for Biology 61.405.

Day division, Fall term: Lectures two hours a week, laboratory four hours a week.

C.A. Barlow

Biology 61.309★

Morphology of Lower Plants

The morphology, reproduction and evolution of lower plants.

Prerequisite: Biology 61.202★.

Not offered 1990-91.

Biology 61.311★

Mycology

The morphology, evolution and biological importance of the fungi.

Prerequisite: Biology 61.202★.

Not offered 1990-91.

Biology 61.312★

Phycology

An advanced half-credit course dealing with the occurrence, ecological role, morphology, reproduction and evolution of the algae.

Not offered 1990-91.

Biology 61.314★

Molecular Genetics

A lecture course dealing with modern advances in molecular genetics.

Precludes additional credit for Biology 61.215 (no longer offered).

Prerequisite: Biology 61.214★ or permission of the Department.

Day division, Winter term: Lectures three hours a week.

This course is strongly recommended as an option for all Biology students with interests in molecular and cell biology, plant or animal physiology, and biotechnology.

G.R. Carmody

Biology 61.321★

Cell Biology

A lecture and laboratory course on the structure, composition, function and development of eukaryotic cells and their organelles.

Prerequisites: Biology 61.220★ and Biology 61.214★ or permission of the Department.

Day division, Winter term: Lectures three hours a week, laboratory four hours a week.

N. Chaly

Biology 61.325★

Plant Physiology

The main topics in physiology and metabolism of plants including nutrition, growth, germination and factors controlling these processes.

Prerequisite: Biology 61.220★ or Chemistry 65.220; Biology 61.202★ or permission of the Department.

Day division, Winter term: Lectures three hours a week, laboratory four hours a week.

J.A. Webb

Biology 61.331★

Microbiology

The biology of microorganisms, particularly in relation to their physiology and economic significance.

Precludes additional credit for Biology 61.330★ (no longer offered).

Prerequisites: Biology 61.100/101 or 61.230★, and Biology 61.220★ or Biochemistry 63.310; the latter may be taken concurrently.

Day division, Winter term: Lectures three hours a week, laboratory four hours a week.

R.C. Wyndham

Biology 61.335★

Animal Physiology

The properties of physiological systems and components of animals with emphasis on their physico-chemical bases. Prerequisites: Biology 61.220★ or Chemistry 65.210. Physics 75.100 or 75.105 and Mathematics 69.107★ and 69.117★ are strongly recommended.

Day division, Fall term: Lectures three hours a week, laboratory four hours a week.

S.L. Jacobson

Biology 61.351★

The Biophysics of Animal Movement

A biophysical treatment of various types of animal motion. Topics covered include the properties of muscles, tendons, bones, joints and the co-ordinated use of these structures. Human locomotion and fitness, bird flight, especially the soaring of the vulture and the albatross, and animal migration are discussed in detail.

Prerequisites: Biology 61.220★ or Chemistry 65.210 and Physics 75.100 or 75.105 or permission of the Department. Day division, Winter term: Lectures three hours a week, tutorial or seminar one hour a week.

J. Sinclair

Biology 61.360★

Introduction to Ecology

An introduction to major concepts in ecology, their scientific basis and their implications for biology and human existence.

Precludes additional credit for Biology 61.261★ (no longer offered).

Prerequisite: Biology 61.102 or 61.209★, and 61.230★ or permission of the Department.

Day division, Fall term: Lectures or tutorials three hours a week; laboratory four hours a week.

H. Damman

Biology 61.361★

Analytical and Experimental Ecology

A half-credit course utilizing the concepts presented in Biology 61.360★ and selected ecological experiments to analyze ecosystem types and the major factors that characterize them.

Prerequisite: Biology 61.360★.

Day division, Winter term: Lectures three hours a week, laboratory four hours a week.

H.G. Merriam

Biology 61.363★

Principles and Practices in Plant Ecology

This half-credit course stresses the dynamics and structures of plant communities. Topics include community structure, nutrient cycling, animal-plant-substrate relationships, sampling and analytical techniques, and resource management.

Prerequisite: Biology 61.360★.

Not offered 1990-91.

Biology 61.365★

Field Course

A half-credit course providing students with an opportunity for intensive, continuous study of living organisms under natural conditions. Credit is based on two weeks of full-time field work with attendant assignments, selected from several one- or two-week modules with various instructors. Costs of long-distance transportation (if applicable), room and board relating to the course are borne by the student. Details may be obtained from the co-ordinator. (Also listed as Psychology 49.323★, animal behaviour modules only.)

Prerequisites: At least one course in Biology beyond the 100 level, and written permission of the Department. No more than one half credit may be obtained from Biology 61.365★.

Day division: All day, approximately six days a week, offered at different times during the year.

Co-ordinator: S.B. Peck

Biology 61.370

The Flora and Fauna of Canada

An introduction to practical taxonomy and biogeography through field and laboratory study of representative Canadian plants and animals with emphasis on local forms. It is recommended that students make collections of plants and animals during the summer before the course is taken. Detailed directions may be obtained from the instructors.

Prerequisites: Biology 61.201★ and 61.202★.

Day division: Lectures two hours a week, laboratory four hours a week.

Biology 61.381★

Plants and Herbivores

This course explores the chemical, physiological, ecological and evolutionary interactions that underlie the relationship between plants and their insect herbivores.

Prerequisites: Biology 61.201★ and 61.202★.

Day division, Fall term: Lectures/seminars three hours a week.

H. Damman

Biology 61.391★

Biology in Society

A seminar half-credit course dealing with selected areas of biological knowledge with direct relevance to social activities of man. Not available as a continuing Science course for students other than Biology Majors except with permission of the student's Major department.

Prerequisite: Biology 61.201★ and 61.202★, 61.214★ or permission of the Department.

Evening division, Winter term: Seminar and discussion three hours a week.

M.E. McCully

Biology 61.392★

Biologists in Canada

A lecture/seminar half-credit course in which the contributions of selected biological and medical scientists to Canadian society are assessed individually and collectively. The emphasis is biographical and involves intensive student participation.

Prerequisite: A 200-level Biology course other than Biology 61.209★ and 61.230★ or permission of the Department.

Not offered 1990-91.

Biology 61.393★

Biology and Development of Renewable Resources

A lecture/seminar half-credit course for senior students in the Faculties of Arts and Social Sciences. Emphasis is placed on the role that biology and agriculture play in economic, technical, political and social development in Canada and in the Third World.

Not a Science continuation course. Available only as a free elective in B. Sc. programs. Available as a Biology option in Biology B.A. programs.

Prerequisites: Co-registration in advanced courses in the student's Major and permission of the Department.

Day division, Fall term: Lectures three hours a week.

J.D.H. Lambert

Biology 61.405**Invertebrate Zoology**

An advanced course on the classification, morphology, comparative physiology and evolution of invertebrate animals.

Prerequisite: Biology 61.305★ or permission of the Department.

Day division: Lectures three hours a week, laboratory four hours a week.

S.B. Peck

Biology 61.408★**Plant Development**

A lecture course dealing with recent advances in our understanding of plant development.

Precludes credit for Biology 61.410 (no longer offered).

Prerequisites: Biology 61.202★ or permission of the Department.

Day division, Winter term: Lectures/seminars three hours a week.

M.E. McCully

Biology 61.409★**Techniques for the Experimental Study of Plant Structure**

A practical course in which students have the opportunity to learn and evaluate modern techniques used in the study of plant structure by optical microscopy.

Precludes credit for Biology 61.410 (no longer offered).

Prerequisite: Biology 61.202★ or permission of the Department.

Not offered 1990-91.

Biology 61.413★**Population Genetics**

Basic ideas of population structure, equilibrium, selection mutation, genetic drift.

Precludes credit for Biology 61.418 (no longer offered).

Prerequisite: Biology 61.214★ or permission of the Department. A course in statistics is highly recommended.

Day division, Fall term: Lectures/seminars three hours a week.

G.R. Carmody

Biology 61.414★**Evolutionary Genetics**

A continuation of Biology 61.413★ dealing with molecular evidence of evolution, speciation as well as the analysis of biometrical traits.

Precludes credit for Biology 61.418 (no longer offered).

Prerequisite: Biology 61.413★ or permission of the Department. A course in statistics is highly recommended.

Not offered 1990-91.

Biology 61.415**Chordate Zoology**

An advanced course on the classification, geographic distribution and evolution of the major groups of chordates. As part of the practical work, each student must make a small collection of specimens of chordates, preferably during the summer before the course is taken. Detailed directions may be obtained from the instructor.

Prerequisite: Biology 61.201★ or permission of the Department.

Not offered 1990-91.

Biology 61.416★**Methods in Molecular Genetics**

The scope and purpose of the course is to review the use of innovative genetic manipulation techniques for the successful solution of problems in molecular biology. The

course is suitable for students with a developing interest in problems of molecular and cellular biology and biochemistry.

Precludes credit for Biology 61.417 (no longer offered).

Prerequisites: Biology 61.215 (or 61.214★ and 61.314★) and 61.331★ or equivalent and a course in Biochemistry or permission of the Department.

Day division, Fall term: Lectures two hours a week.

J.P. Vierula

Biology 61.419★**Laboratory Techniques in Molecular Genetics**

This laboratory course is complementary to Biology 61.416★. It is designed to give the student some practical familiarity with methodology in molecular genetic techniques. The laboratory is suitable for students with a developing interest in problems of molecular and cellular biology and biochemistry.

Precludes credit for Biology 61.417 (no longer offered). Enrolment limited.

Prerequisites: Biology 61.331★ and 61.416★ or equivalent and a course in Biochemistry or permission of the Department.

Day division, Winter term: Lecture/laboratory six hours a week in two sessions.

J.P. Vierula

Biology 61.421★**Cell Biology**

An advanced course dealing with the current state of knowledge of the structure, molecular organization, reproduction and functions of eukaryotic cells and their organelles.

Precludes credit for Biology 61.424 (no longer offered).

Prerequisites: Biology 61.321★ and either Biochemistry 63.310 or Biology 61.314★, or permission of the Department.

Not offered 1990-91.

Biology 61.422★**Viruses and Eucaryotic Cells**

This course deals with both RNA and DNA viruses. Emphasis is placed on the mode of replication of these viruses in susceptible cells. Some topics to be covered are: negative and positive stranded RNA viruses; multigenomic viruses; DNA cytoplasmic and nuclear viruses; retroviruses; viroids and prions.

Precludes additional credit for Biology 61.424 (no longer offered).

Prerequisites: Biology 61.321★ and either Biochemistry 63.310 or Biology 61.314★, or permission of the Department.

Not offered 1990-91.

Biology 61.423**Analytical Cell Biology**

A lecture and laboratory course dealing with the theory and practice of modern analytical methods used in experimental cell biology. Emphasis is on methods that give information relating to cell structure or structure-function relations such as fixing, sectioning, staining, light and electron microscopy, autoradiography, photomicrography and biophysical methods. Some treatment of related biochemical techniques such as cell fractionation, electrophoresis and immunodiffusion is also included. The main emphasis is on independent laboratory work.

Prerequisite: Biology 61.321★ or equivalent or permission of the Department.

Not offered 1990-91.

Biology 61.426★

Advanced Plant Biochemistry

A lecture and seminar course dealing with recent developments in selected areas of plant biochemistry.

Prerequisites: Biology 61.325★ and Chemistry 65.220 or permission of the Department.

Not offered 1990-91.

Biology 61.427★

Topics in Crop Physiology

An advanced lecture and seminar course concerning the world's major crop plants and dealing with topics selected from recent advances in metabolism, physiology, yield, disease and control of pest infestation.

Prerequisite: Biology 61.325★ or permission of the Department. Biochemistry 63.310 is recommended.

Not offered 1990-91.

Biology 61.428★

Physiology of Plant Growth and Development

An advanced course dealing with the physiological processes, hormonal and environmental factors that regulate the different phases of growth and development in angiosperm plants.

Prerequisites: Biology 61.325★ and Chemistry 65.220 or permission of the Department.

Not offered 1990-91.

Biology 61.429★

Advanced Plant Physiology

An advanced course dealing with recent developments in selected topics of plant physiology.

Prerequisite: Biology 61.425 (no longer offered).

Prerequisites: Biology 61.325★ and Chemistry 65.220 or permission of the Department.

Not offered 1990-91.

Biology 61.430★

Topics in Applied Environmental Microbiology

Environmental microbiology examines ecological interactions within microbial communities and between microorganisms and their biotic and abiotic environments. This course illustrates recent applications of such studies to the development of microbial processes of practical importance, such as treatment of wastes and pollutants, insect control, nitrogen fixation and production of foods, pharmaceuticals, fuels and other chemicals.

Prerequisites: Biology 61.331★, Biochemistry 63.310 or permission of the Department.

Evening division, Fall term: Lectures and seminars two hours a week.

Biology 61.431★

Current Topics in Biotechnology

A lecture/seminar course that explores current usage and some practical problems of the industrial and technological exploitation of biological systems. Opportunity is provided for visits to operating production and research facilities.

Prerequisites: Biology 61.215, (or 61.214★ and 61.314★), 61.331★ or Biochemistry 63.310 or permission of the Department.

Not offered 1990-91.

Biology 61.432★

In vitro Manipulation of Animal Cells

A lecture and laboratory course on the theory and practice of animal cell culture. The following topics are emphasized: sterile technique; medium composition and growth regulation; the immune system and principles of the immune response; production, screening and application of poly-

clonal and monoclonal antibodies.

Prerequisite: Biology 61.321★ or equivalent, or permission of the Department. Enrolment limited.

Day division, Fall term: Lectures two hours a week, laboratory four hours a week.

N. Chaly

Biology 61.433★

Plant Cell and Tissue Culture: Theory and Practice

This course deals with the theory and practice of plant cell culture and *in vitro* regeneration from protoplasts, tissue explants and excised germinal tissue. The course considers the potential of applying these principles to produce transformed and improved cultivars of agronomic and pharmaceutical importance as aspects of plant biotechnology.

Prerequisites: Biology 61.325★ and 61.321★ or permission of the Department. Enrolment limited.

Not offered 1990-91.

Biology 61.435

Animal Physiology

A course dealing in some detail with advances made in particular areas of animal physiology. (1990-91: neurophysiology.)

Prerequisites: Biology 61.335★, Chemistry 65.220 and Physics 75.100 or 75.105, or permission of the Department.

Day division: Lectures two hours a week, laboratory four hours a week.

D.R. Gardner

Biology 61.440

Taxonomy of the Flowering Plants

A general survey of the flowering plants, the bases for classification and the history of taxonomy. A project is assigned.

Prerequisite: Biology 61.202★ or permission of the Department.

Not offered 1990-91.

Biology 61.447

Quantitative Ecology

Quantitative and qualitative analyses of the distribution and abundance of plant and animal species and communities, and of related environmental phenomena.

Prerequisite: Biology 61.360★ and 61.361★ and Mathematics 69.257★ or equivalent or permission of the Department.

Not offered 1990-91.

Biology 61.455

Animal Development

A lecture, seminar and laboratory course on the descriptive and experimental parameters of animal development.

Prerequisites: Biology 61.201★ or permission of the Department.

Not offered 1990-91.

Biology 61.460

Insect Morphology

A course on the morphology, evolution and function of insect structures of the more important orders and families of insects. This course is complementary to Biology 61.461, which is offered in alternate years.

Prerequisite: Biology 61.201★ or permission of the Department.

Not offered 1990-91.

Biology 61.461

Principles of Systematic Entomology

A lecture and laboratory course devoted to the study of identification of insects, the principles of theoretical

taxonomy, some aspects of insect behaviour and control measures. Instructions and equipment for the required insect collection can be obtained from the instructor in the spring prior to the course. This course is complementary to Biology 61.460, which is offered in alternate years.

Prerequisite: Permission of the Department.

Day division: Lectures two hours a week, laboratory four hours a week.

H.F. Howden

Biology 61.469★

Evolutionary Concepts

Evolution as related to gene pools, isolation, speciation, natural selection, competition, dominance, and distributional patterns; examples from North American biota are emphasized.

Prerequisites: Biology 61.360★ or permission of the Department.

Day division, Fall term: Lectures two hours a week, laboratory four hours a week.

H.F. Howden

Biology 61.471★

Evolution and Biogeography

A continuation of concepts developed in Biology 61.469★ and applied to world biotic patterns. Community evolution, tropical diversity and temporal stability are considered.

Prerequisite: Biology 61.469★ or permission of the Department.

Day division, Winter term: Lectures two hours a week, laboratory four hours a week.

H.F. Howden

Biology 61.475

History of Biology

A seminar course on the history of biology and biological theory.

Prerequisites: Biology 61.214★, a course in physiology at least concurrently, and permission of the Department.

Not offered 1990-91.

Biology 61.481★

Animal Behaviour

An advanced half-credit course in the study of animal behaviour. Topics such as predator-prey interactions, mating behaviour, migration, mother-young interactions, social behaviour and inter- and intra-specific spacing behaviour are interpreted in an ecological context. Lectures, seminars and laboratories are used to achieve this coverage.

Prerequisites: Biology 61.201★, and 61.360★ (may be taken concurrently), or permission of the Department.

Day division, Fall term: Lectures two hours a week, laboratory four hours a week.

Biology 61.490

Directed Special Studies and Seminar

Day division: Annually, with permission of the Department.

Biology 61.491★

Directed Special Studies

Day division, both terms: Annually, with permission of the Department.

Biology 61.497

Independent Study

A course for independent research and study from library sources, under the supervision of a member of the Department, open only to students in the Honours B.A. programs. A major paper reporting the research must be submitted to the supervisor by April 1 of the Winter session or August 15

of the Summer session, and the student will be examined orally on the topic of the paper by a panel of three faculty members.

Precludes additional credit for Biology 61.498.

Biology 61.498

Research Project

Fourth-year B.Sc. Honours students must carry out a research project under the supervision of a member of the Department. Fourth year B.A. Honours students may take Biology 61.498 if they demonstrate to the Associate Chairman for Undergraduate Studies that they have adequate experience in the laboratory. Approval of the topic and research schedule must be obtained from the Supervisor and Chairman before the last day for late registration. Each student's performance is examined by a faculty committee after the completion of the project. 70 percent of the grade is awarded by the supervisor based on the completed research report, and the student's performance in the project. 30 percent of the grade is awarded by the supervisor and two advisers based on the report and the student's performance in an oral examination on the report. The written report must be submitted by the last day for submission of course assignments. Extensions of the deadline will be allowed only at the discretion of the Chairman of the Department.

Precludes additional credit for Biology 61.497.

Biotechnology Co-ordinators

Biology: J.A. Webb

Biochemistry: J.M. Neelin

General Information

Biotechnology is concerned with the design, modification and controlled use of living organisms and their metabolic systems to carry out a wide range of useful processes in agriculture, manufacturing and service industries. This is an important and growing field for the application of biological studies to industrial, commercial, agricultural and environmental problems. Important areas include fermentation and enzyme technology, genetic engineering and other cellular manipulations.

Biotechnology at Carleton

A number of scientists at Carleton carry out research in topics related to biotechnology. Some areas currently under investigation include:

metabolic engineering and applied microbiology;
genetic engineering;
natural products for biological control;
cell and tissue technology.

By completing a particular pattern of options in Biology or Biochemistry, undergraduates interested in careers in this expanding area can qualify for an Honours B.Sc. in Biology and Biotechnology, or in Biochemistry and Biotechnology. These programs provide the basic grounding in biology and chemistry, yet allow inclusion of specialized courses related to biotechnology. The biology version allows for more emphasis at the cell and organizational level, while the biochemistry version has a greater concentration at the molecular level. One of the requirements is completion of an Honours research project in a topic related to current studies in biotechnology. In special cases, students may carry out the project in a local laboratory outside of the University, with joint supervision by a faculty member and an outside scientist. A more extensive experience in an industrial or government laboratory environment is possible in the five-year Co-operative Option in Biochemistry and Biotechnology, in which credit for a full year of research or technical experience may be incorporated into the curriculum. Such arrangements must be approved individually by the department/institute and the appropriate Biotechnology Co-ordinator. When possible, special courses will be offered in subjects of direct application in biotechnology.

Courses required for the Biotechnology designation (in addition to other program requirements) include: Organic Chemistry (Chemistry 65.220), Statistics (Mathematics 69.257★), General and Industrial Biochemistry (Biochemistry 63.305★, 63.310, 63.404★), Cytology (Biology 61.321★), Microbiology (Biology 61.331★), Molecular Genetics and/or Cell Biology (selected from Biology 61.416★, 61.419★, 61.423, 61.432★, 61.433★) and at least a half credit in Biotechnology (Biology 61.430★ or 61.431★).

For information on course patterns for students entering these programs with, or without, the Ontario Academic Course or Ontario Grade 13 in Biology should refer to p. 356 for complete information.

Honours in Biology and Biotechnology

Course requirements are 20 credits, in a pattern approved by the appropriate Biotechnology Co-ordinator:

1. Eight Biology credits: Biology 61.201★, 61.202★, 61.209★, 61.214★, 61.220★, 61.230★, 61.314★, 61.321★, 61.325★, 61.331★, 61.335★, 61.360★, one of 61.430★ or 61.431★; one credit from 61.416★, 61.419★, 61.423, 61.432★ or 61.433★; one half credit Biology option.
2. Two Biochemistry credits: Biochemistry 63.310, 63.305★, 63.404★.
3. Two Chemistry credits: Chemistry 65.100 and 65.220.
4. One Physics credit: Physics 75.100 or 75.105.
5. One-and-one-half Mathematics credits: Mathematics 69.107★, 69.117★, 69.257★.
6. One-and-one-half credits to be chosen from Biology 61.416★, 61.419★, 61.421★, 61.422★, 61.423, 61.427★, 61.428★, 61.430★, 61.431★, 61.432★, 61.433★; Biochemistry 63.401★, 63.402★, Chemistry 65.210, 65.370★, Technology, Society, Environment 59.401★, and 59.402★. In special cases, other advanced Science courses may be approved by the Biotechnology Co-ordinator.
7. Two approved credits offered by the Faculties of Arts or Social Sciences.
8. One free option credit (unless Biology 61.102 is offered in lieu of the Ontario Academic Course in Biology).
9. A research project (Biology 61.498) in an area approved by the Biotechnology Co-ordinator.

Honours in Biochemistry and Biotechnology

Course requirements are 20 credits, in a pattern approved by the appropriate Biotechnology Co-ordinator:

1. Five Biology credits: Biology 61.214★, 61.230★, 61.314★, 61.321★, 61.331★, one of 61.325★ or 61.335★; one of 61.430★ or 61.431★; one credit from 61.416★, 61.419★, 61.423, 61.432★, 61.433★; 61.209★, unless Biology 61.102 is offered in lieu of the Ontario Academic Course in Biology (see 8 below).
2. Three Biochemistry credits: Biochemistry 63.305★, 63.310, 63.401★, 63.402★, 63.404★.
3. Five Chemistry credits: Chemistry 65.100, 65.210, 65.220, 65.231★, 65.321★, 65.322★, 65.325★.
4. One Physics credit: Physics 75.100 or 75.105.
5. One-and-one-half Mathematics credits: Mathematics 69.107★, 69.117★, 69.257★.
6. One credit chosen from Biology 61.325★, 61.335★, 61.416★, 61.419★, 61.421★, 61.422★, 61.423, 61.430★, 61.431★, 61.432★, 61.433★, Biochemistry 63.403★, Chemistry 65.370★. In special cases, other advanced Science courses may be approved by the Biotechnology Co-ordinator.
7. Two approved credits offered by the Faculties of Arts or Social Sciences.
8. One-half credit free option (unless Biology 61.102 is offered in lieu of the Ontario Academic Course in Biology; see 1 above).
9. A research project (Biochemistry 63.498) in an area approved by the Biotechnology Co-ordinator.

Honours in Biochemistry and Biotechnology (five-year Co-operative Option)

For students who are strongly interested in practical experience in a biotechnology laboratory, the Institute may arrange a full year of employment in a commercial, industrial or governmental facility. This co-operative option will be taken after completion of three years (normally 15

credits) in the Biochemistry/Biotechnology program. During the co-operative year, the student will register (on a part-time basis) in Biochemistry 63.490, which will provide a full credit towards the program requirements. The remaining program requirements (normally four credits) will then be completed in the fifth year.

Students who are already accepted in the Biochemistry/Biotechnology program may apply for the co-operative option, and should make application to the Director of the Biochemistry Institute by January 15 of the student's third year of study (i.e. following completion of 10 credits and before completion of 16 credits in the program). The program will be limited by the availability of placement opportunities, and acceptance will depend on both academic performance and suitability for the available employment. Students accepted into the program will be notified as soon as possible, and terms of employment and starting dates will be arranged with the prospective employers. The 12-month Co-operative year will normally begin in January, May or September, when the student will register as a part-time student in Biochemistry 63.490. Periodic progress reports will be required and credit will be given upon satisfactory completion of a final report on the work experience.

Program Requirements

The 20 credits required for the degree of B.Sc. in Biochemistry and Biotechnology (Co-operative Option) are as outlined above for Biochemistry and Biotechnology, with the additional requirement of Biochemistry 63.490, which will be substituted for one credit of the following courses:

Biology 61.416★, 61.419★, 61.423, 61.430★, 61.431★, 61.432★, 61.433★ (item 1); Biochemistry 63.401★, 63.402★, 63.404★ (item 2).

The substitution, specified at the Co-ordinator's discretion, will depend on the content and experience already obtained in Biochemistry 63.490.

Notes on Programs

In the Biology/Biotechnology program, "Honours Subjects" used for calculation of Honours grade-point averages include all courses taken in Biology and Biochemistry.

In the Biochemistry/Biotechnology program, "Honours Subjects" used for calculation of Honours grade-point averages include all courses taken in Biochemistry, plus the Biology and Chemistry courses specified in 1 and 3 above. In the Co-operative option, Biochemistry 63.490 will be graded simply as Satisfactory/Unsatisfactory, and will not be included in calculation of grade-point averages.

Typical Course Patterns

Biology and Biotechnology

First Year

Biology 61.209★ (or 61.102†); 61.230★;
Chemistry 65.100;
Physics 75.100 (or 75.105);
Mathematics 69.107★, 69.117★;
One credit, Arts or Social Sciences option.

Second Year

Biology 61.201★, 61.202★, 61.214★, 61.220★, 61.314★,
61.331★;
Chemistry 65.220;
One credit, Arts or Social Sciences option.

Third Year

Biology 61.321★, 61.325★, 61.335★, 61.360★, one-half
Biology option;
Biochemistry 63.310 and 63.305★;
Mathematics 69.257★;
One half credit, free option.†

Fourth Year

One credit from Biology 61.416★, 61.419★, 61.423,
61.432★, 61.433★;
One-and-a-half advanced option credits (see 6 above);
Biochemistry 63.404★;
Biology 61.430★ or 61.431★;
Biology 61.498;
One half credit, free option.†

Biochemistry and Biotechnology

First Year

Biology 61.209★ (or 61.102†), 61.230★;
Chemistry 65.100;
Biochemistry 63.404★;
Physics 75.100;
Mathematics 69.107★, 69.117★;
One credit, Arts or Social Sciences option.
One-half credit free option+ (e.g. 61.220★).

Second Year

Biology 61.214★, 61.314★;
Chemistry 65.210, 65.220, 65.231★;
One credit, Arts or Social Sciences option.
One half credit, free option.†(e.g. 61.220★).

Third Year

Biology 61.325★ or 61.335★;
Biology 61.321★, 61.331★;
Biochemistry 63.305★, 63.310;
Chemistry 65.321★, 65.322★, and 65.325★;
Mathematics 69.257★;

Fourth Year

One credit from Biology 61.416★, 61.419★, 61.423,
61.432★, 61.433★;
One advanced option credit (see 6 above);
Biochemistry 63.401★, 63.402★, 63.404★;
Biology 61.430★ or 61.431★;
Biochemistry 63.498.

† See 1 and 8 above if Biology 61.102 is offered in lieu of the Ontario Academic Course or Grade 13 in Biology.

Biochemistry and Biotechnology (Co-operative Option)

First to Third Years
as above

Fourth Year

Biochemistry 63.490.

Fifth Year

Biochemistry 65.322★, 63.498.
Two credits chosen in consultation with the Institute of
Biochemistry from Biology 61.416★, 61.419★, 61.423,
61.430★, 61.431★, 61.432★, 61.433★, and Biochemistry
63.401★, 63.402★ or 63.404★.
One advanced option credit (see 6 above).

Steacie Building, Room 203
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Officers of Instruction

Chairman

R.A. Shigeishi

Professors

J.W. ApSimon
R.G. Barradas
G.W. Buchanan
C.L. Chakrabarti
B.R. Hollebone
J.A. Koningstein
P. Kruus
C.S. Tsai
D.C. Wigfield
D.R. Wiles
J.S. Wright

Associate Professors

P.H. Buist
E.P.C. Lai
M. Parris
R.A. Shigeishi
R.H. Wightman

Assistant Professors

A.D. Bawagan
R.J. Crutchley

*Natural Sciences and Engineering Research Council
University Research Fellow*
R.J. Crutchley

Adjunct Research Professors

O.E. Edwards, *National Research Council*
R. Greenhalgh, *Agriculture Canada*
D.C. Gregoire, *Department of Energy, Mines and Resources*
L.V. Haley, *Department of Chemistry, Carleton University*
M. Malaiyandi
H.H. Mantsch, *National Research Council*
S.A. Narang, *National Research Council*
J.A. Ripmeester, *National Research Council*
K.W. Siu, *National Research Council*
J.J. Sloan, *National Research Council*
I.C.P. Smith, *National Research Council*

General Information

Students intending to enter a program in Chemistry should have a strong background in mathematics and physics as well as in chemistry. The three-year Major and four-year Honours programs in Chemistry are described below. Students interested in continuing their careers in secondary school teaching, graduate studies or as professional chemists are advised to enrol in the Honours program.

Combined Honours programs in Chemistry and Geology and in Chemistry and Physics are available as described below.

While Combined Honours in Chemistry and Mathematics are not formally available, strong continuation groupings in Mathematics can be arranged under the Honours

Chemistry program. Secondary specialization in Biology can be arranged under the Honours Chemistry program, or under the joint program in Honours Biochemistry. In evaluating students for entry with advanced standing, the Department of Chemistry transfers credits but not grades.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 349-350), in addition to all departmental regulations and requirements as set out below.

The designation of Honours degree awarded for students in the Combined Honours program is determined on the basis of their grade-point average for all required credits in the two Major subjects as specified in the respective program requirements.

For students in the Honours program, the designation of Honours degree will be determined by a student's grade-point average on all required Chemistry courses.

Major Program

A total of ten credits is required for graduation after completion of the First-year Science faculty requirements. These requirements must be completed before continuation into Second year and must include Chemistry 65.100, Mathematics 69.107★, 69.117★, Physics 75.100 and one other First-year Science credit.

The total program (including First year) must contain:

1. Chemistry 65.100, 65.210, 65.220, 65.230 and two credits at the 300 level including Chemistry 65.311★, 65.353★ and at least one of 65.315★, 65.325★ or 65.355★. (Note: Chemistry 65.355★ requires both Chemistry 65.353★ and 65.354★ as prerequisites.)
2. Mathematics 69.107★, 69.117★ and 69.202 or approved equivalents, e.g. 69.207★ and 69.208★;
3. Physics 75.100, and 75.236★ or approved equivalents;
4. A Science Continuation half credit not in Chemistry;
5. A First-year Science credit (as required in the First-year program);
6. Two Arts or Social Science credits (see Faculty of Science regulations);
7. One Science credit or other approved credit chosen after consultation with the Department of Chemistry;
8. One free credit.

In addition to the Faculty requirement of a C- average in Chemistry, the Department also requires a grade of C- or better in at least half of all Chemistry courses taken.

It is recommended that candidates choose a course in French, German or Russian as one of their Arts credits.

Honours Program

A total of 15 credits is required for the degree after completion of First-year Science requirements. These requirements are the same as for the Major program except that, based on the results of an assessment test and permission of the Chairman of the Department, outstanding students

may be allowed to take Chemistry 65.220 in the First year instead of Chemistry 65.100. However, the total number of credits required will remain unchanged. In addition to the Faculty requirement of a C+ average in Chemistry, the Department also requires a grade of C+ or better in at least half of all Chemistry courses taken.

The total program (including First year) must contain:

1. Chemistry 65.100, 65.210, 65.220, 65.230, 65.311★, 65.321★, 65.353★, 65.354★, 65.315★, 65.325★, 65.355★, one credit at the 400 level in Chemistry or Biochemistry 63.310, one half credit at the 300 or 400 level in Chemistry; and Chemistry 65.498.
2. Mathematics 69.107★, 69.117★ and 69.202 or approved equivalents, e.g. 69.207★ and 69.208★;
3. Physics 75.100 and 75.236★ or approved equivalents;
4. A Science Continuation half credit not in Chemistry;
5. A First-year Science credit (as required in the First-year program);
6. Two Arts or Social Science credits (see Faculty of Science regulations);
7. Two further credits. These will normally be in Chemistry or other Sciences, but students who wish to broaden and strengthen a non-science interest may receive approval for non-science courses which are part of a well-thought-out and coherent non-science pattern.
8. One free credit.

Honours Project

All Honours candidates are required, as part of Chemistry 65.498, in the final year to carry out a substantial project and to write a report to their supervisor. Towards the end of the Third year, prospective candidates should obtain pertinent information from the departmental office. Brief progress reports are to be presented to the supervisor and committee members early in November and February. The deadline for submission of the final typed report is the first Monday in April. Honours students are also expected to attend departmental seminars in their specialty. The report and its defence are heavily weighted in determining the class of Honours awarded. The grade of *In Progress* will be restricted to unusual circumstances and be subject to approval by the Department.

Combined Honours in Chemistry and Geology

Program Advisers: C.L. Chakrabarti and G.Y. Chao

A grade of C+ or better in both Chemistry 65.100 and Geology 67.100 and overall Honours standing are required for admittance to the program. Program requirements are as follows:

1. Chemistry 65.100, 65.210, 65.230, 65.353★, 65.354★ and one Chemistry credit at the 400 level.
2. Geology 67.100, 67.221★, 67.222★, 67.228★, 67.281★, 67.323★, 67.324★ and one Geology credit at the 400 level;
3. Either Chemistry 65.498 or Geology 67.498. Students should consult their program adviser about selection of this in their Third year;
4. One Chemistry or Geology credit;
5. Mathematics 69.107★, 69.117★ and 69.202;
6. Physics 75.100;
7. Two Science credits, of which one must be outside Chemistry and Geology;

8. Two Arts or Social Science credits;

9. One free credit.

10. A language requirement must be met during the Third year by passing a course in, or demonstrating reading proficiency in one of French, German or Russian.

A typical program is as follows:

First Year

Chemistry 65.100;
Geology 67.100;
Mathematics 69.107★ and 69.117★
Physics 75.100;
One Arts or Social Science credit.

Second Year

Chemistry 65.210 and 65.230;
Geology 67.221★, 67.222★, 67.228★ and 67.281★;
Mathematics 69.202.

Third Year

Chemistry 65.353★ and 65.354★;
Geology 67.323★ and 67.324★;
One Chemistry or Geology credit;
One Science credit;
One Arts or Social Science credit.

Fourth Year

Chemistry 65.498 or Geology 67.498;
One Chemistry credit at the 400 level;
One Geology credit at the 400 level;
One Science credit;
One elective credit.

Combined Honours in Chemistry and Physics

Program Advisers: A.L. Carter and P. Kruus

A total of 15 credits are required for the degree after completion of the First-year Science requirement. A grade of C+ or better in both Chemistry 65.100 and Physics 75.100, and overall Honours standing are required before admittance to the program. Course requirements are as follows:

First Year

Physics 75.100;
Chemistry 65.100;
Mathematics 69.107★ and 69.117★;
One credit free option;
(Mathematics 69.102 and 69.112 may be taken in place of Mathematics 69.107★, 69.117★ and one credit free option);
One acceptable Arts or Social Science credit.

Second Year

Physics 75.211★, 75.222★, 75.235★, 75.236★;
Chemistry 65.210;
If Mathematics 69.107★ and 69.117★ are taken in First year, Mathematics 69.207★, 69.208★ and 69.217★ (or Mathematics 69.202 and Mathematics 69.257★);
If Mathematics 69.102 and 69.112 are taken in First year, Mathematics 69.208★ and two half credits free options;
One half course acceptable Arts or Social Science credit.

Third Year

Physics 75.307★ (or 75.308★), 75.361★, 75.362★, 75.386★ (or Mathematics 69.375★ and 69.376★);
Chemistry 65.220, 65.311★, 65.312★, 65.353★.

Fourth Year

Physics 75.477★, 75.338★, 75.478★ (or 75.408★);
 Chemistry 65.315★, 65.354★;
 Two of Chemistry 65.410★, 65.411★, 65.412★, 65.413★;
 One Honours project;
 One half course Arts or Social Science credit.

Graduate Program

The Department of Chemistry offers studies leading to the degree of Master of Science and to the degree of Doctor of Philosophy. For further details consult the Graduate Studies and Research Calendar.

Courses Offered**Chemistry 65.010****Introductory Chemistry**

An introductory course emphasizing the fundamental laws and principles of chemistry. Accurate working of numerical problems forms an important part of the course. The laboratory course is designed to teach fundamental techniques and to give familiarity with some physical and chemical properties of a selected group of substances. Precludes additional credit for OAC Chemistry. Prerequisite: Ontario Grade 12 Chemistry or equivalent. Day division: Lectures three hours a week, laboratory three hours a week.

Chemistry 65.100**General Chemistry**

Solution equilibria, acid and base chemistry; electronic structure of atoms; energy states and spectra; descriptive chemistry and periodic properties of the elements; the structure of covalent and ionic substances; energy relationships and theories in bonding, equilibria, and rates of reactions. The laboratory course gives training in fundamental techniques and methods of experimental work in analysis, synthesis and other aspects of chemistry. Precludes additional credit for Chemistry 65.111★. Prerequisites: Chemistry 65.010 and Mathematics 69.006★ and 69.007★, or equivalent. This course is intended for students in all programs who plan to take further chemistry courses. Day division: Lectures three hours a week, laboratory three hours a week.

Chemistry 65.107**The Chemistry of Art and Artifacts**

A non-mathematical course designed for archaeologists and historians dealing with the deterioration and preservation of artifacts and works of art. This course treats: the nature and reactions of chemical substances such as stone, metal, wood, and painting materials; modern methods of studying materials and their deterioration; methods of arresting deterioration. Guest lectures and visits to local laboratories and other sites will be arranged. Prerequisite: At least one year of High School Chemistry is recommended. Day division: Lectures three hours a week.

Chemistry 65.111★**Chemistry for Engineering Students**

This course is designed to familiarize students with chemical principles applicable to engineering problems. Topics include atomic structure, the periodic table, chemical bonding, molecular structure, chemical thermodynamics, chemi-

cal equilibrium, chemical kinetics, catalysis, properties of electrolytic solutions, galvanic and electrolytic cells, fuel cells, and corrosion. The laboratory course is designed to give skill in, understanding of, and appreciation of the most important basic techniques and methods used in experimental chemical work. This course is not a prerequisite for further chemistry courses. Individual students wishing to take further chemistry courses will, however, be considered on their merits.

Precludes additional credit for Chemistry 65.100.

Prerequisites: Chemistry 65.010, Mathematics 69.006★ and 69.007★, or equivalents.

Day division, Both terms: Lectures three hours a week, laboratory three hours a week.

Chemistry 65.210**Physical Chemistry**

An introduction to thermodynamics and its application to problems of phase equilibria, chemical equilibria, surface chemistry and electrochemistry. Principles of chemical dynamics and their application to analysis of reaction mechanisms.

Prerequisites: Chemistry 65.100 and Mathematics 69.107★ and 69.117★ or equivalent.

Day division: Lectures three hours a week, problems one hour a week, laboratory three hours a week.

Chemistry 65.220**Organic Chemistry**

Structure, synthesis and reactions of the main functional groups using both aliphatic and aromatic examples and emphasizing a mechanistic approach. Elementary stereochemistry. Biologically and industrially important molecules are used as examples whenever possible. The laboratory includes transformations and characterization of selected functional groups as well as introductory spectroscopy.

Precludes additional credit for Chemistry 65.222 (no longer offered).

Prerequisite: Chemistry 65.100.

Day division: Lectures three hours a week, laboratory three hours a week.

Chemistry 65.230**Analytical Chemistry**

Introduction to analytical chemistry. Understanding of principles and methods of chemical analyses. Knowledge of instruments and their applications. Data treatment. Evaluation and interpretation of results. Solving chemical problems. General knowledge of why certain analyses are done. Qualitative identification and quantitative determination of both atomic and molecular species. The laboratory provides hands-on experience and training of techniques. Prerequisites: Chemistry 65.100, Mathematics 69.107★ and 69.117★ or equivalent.

Day division: Lectures three hours a week, laboratory three hours a week.

Chemistry 65.231★**Analytical Chemistry**

A half-credit course for non-Chemistry Majors on the theory and practice of gravimetric, titrimetric and instrumental analysis. Emphasis is placed on experimental techniques required for analysis of biological and environmental samples.

Precludes additional credit for Chemistry 65.230.

Prerequisite: Chemistry 65.100.

Day division, Winter term: Lectures and problems three hours a week, laboratory three hours a week.

Chemistry 65.280★**Environmental Chemistry**

This course provides a general introduction to the detection, monitoring and analyses of pollutants and the physical and chemical processes governing environmental quality. The chemistry of the atmosphere and the aquatic environment are emphasized. Specific topics include the reactions and effects of atmospheric gaseous and particulate pollutants on the ozone layer, global temperatures and human activity. The composition of natural water bodies is studied with respect to the nature of suspensions, sediments and dissolved chemicals and their impact on microbiological processes. The nature and fate of chemicals from industrial, agricultural and domestic sources are followed to clarify the long-term effects of these pollutants. Drinking water and wastewater treatment are discussed. An accompanying laboratory component provides practical experience in detection, separation interpretation and analyses of chemical pollutants.

Prerequisite: Chemistry 65.231★

Text: *S.E. Manahan Environmental Chemistry*

To be offered first in 1991-92.

Chemistry 65.311★**Quantum Chemistry I**

Hamilton's equations of motion. Postulates of quantum mechanics. Schrodinger wave equation. Particle-in-a-box, tunneling, uncertainty principle. Harmonic oscillator and vibrational spectra. Rigid rotor and rotational spectra. Hydrogen atom, atomic spectra, magnetic effects. Hydrogen molecular ion and molecular orbitals.

Prerequisites: Chemistry 65.210, Mathematics 69.202, or equivalent.

Day division, Fall term: Lectures and problems three hours a week.

Chemistry 65.312★**Quantum Chemistry II**

Molecular orbital theory of bonding and spectra of diatomic molecules. Polyatomic molecules, hybrid orbitals. Dipole moment and electronegativity. Symmetry and classification of electronic energy levels. Hückel theory of conjugated molecules, $4n+2$ rule. Selection rules for electronic transitions. Introduction to statistical mechanics.

Prerequisite: Chemistry 65.311★.

Day division, Winter term: Lectures and problems three hours a week.

Chemistry 65.315★**Experimental Physical Chemistry**

A laboratory-based course designed to acquaint students with advanced concepts in physical chemistry and the use of more advanced physico-chemical techniques in other areas of chemistry. Students are responsible for literature surveys, acquisition of theoretical background, design of experimental procedures and mathematical analysis of data.

Prerequisites: Chemistry 65.210 and at least one of 65.220 or 65.230. Prerequisite or co-requisite: Chemistry 65.311★.

Day division, Both terms: Laboratory and seminars four hours a week.

Chemistry 65.321★**Advanced Organic Chemistry I**

Instrumental methods for determining organic structures. Selected organic reactions with emphasis on mechanisms and reactive intermediates.

Prerequisite: Chemistry 65.220 or equivalent.

Day division, Fall term: Lectures three hours a week.

Chemistry 65.322★**Advanced Organic Chemistry II**

Continued mechanistic survey of additional organic reactions with emphasis on synthetic usefulness and stereochemistry. Interspersed with selected topics such as instrumental methods, photochemistry, literature of organic chemistry, natural and synthetic polymers, heterocycles, terpenes and alkaloids.

Prerequisite: Chemistry 65.321★ or equivalent.

Day division, Winter term: Lectures three hours a week.

Chemistry 65.325★**Experimental Organic Chemistry**

A laboratory-based course including advanced concepts and techniques in organic synthesis, structure determination, and the rates and mechanisms of reactions. Students are responsible for literature surveys, acquisition of theoretical background, and design of experimental procedures.

Prerequisite: Chemistry 65.220.

Prerequisite or co-requisite: Chemistry 65.321★ or Biochemistry 63.310 or permission of the Department.

Day division, Both terms: Laboratory and seminars four hours a week.

Chemistry 65.353★**Inorganic Chemistry I**

An introduction to quantum theory and atomic structure. The periodic system, chemistry of the p-block, transition and lanthanide elements. Symmetry and chemical bonds. Structure and energetics.

Prerequisites: Chemistry 65.210 and 65.230. Chemistry 65.311★ concurrently is recommended.

Day division, Fall term: Lectures three hours a week.

Chemistry 65.354★**Inorganic Chemistry II**

The electronic structure of molecules. Topics to be chosen from: chemistry of co-ordination compounds; nomenclature, isomerism, stability constants, bonding, thermodynamics and kinetics, chemistry of organometallic compounds, bioinorganic chemistry — the role of transition metals in nature.

Prerequisite: Chemistry 65.353★.

Day division, Winter term: Lectures three hours a week.

Chemistry 65.355★**Experimental Inorganic and Analytical Chemistry**

A laboratory-based course including advanced concepts and techniques in inorganic synthesis, structure determination and analytical chemistry. Students are responsible for literature surveys, acquisition of theoretical background, design of experimental procedures and mathematical analysis of data.

Prerequisite: Chemistry 65.210 and 65.230.

Prerequisite or co-requisite: Chemistry 65.353★ and 65.354★ or permission of the Department.

Note: withdrawal from or a final grade of *F* or *FNS* in Chemistry 65.353★ will require deregistration from Chemistry 65.355★.

Day division, Both terms: Laboratory four hours a week.

Chemistry 65.370★**Industrial Applications of Chemistry**

A course reviewing, relating and extending the material of prerequisite Chemistry courses through studies of problems in applied chemistry and introducing concepts necessary for conversion of laboratory processes to the industrial scale. The course covers several topics designed to illustrate a wide range of applications in as many areas of chemistry as possible.

Prerequisites: Chemistry 65.210, and one of Chemistry 65.220 or 65.230.
Given in alternate years with Chemistry 65.372★.
Not offered 1990-91.

Chemistry 65.372★

Transport Processes and Unit Operations

A course introducing chemists to some more common problems of interest to chemical engineers: fluid flow; steady and unsteady-state heat transfer; mass transfer; gas-liquid, liquid-liquid and solid-liquid separation processes.

Prerequisite: Chemistry 65.210 or permission of the Department.

Given in alternate years with Chemistry 65.370★.

Not offered 1990-91.

Chemistry 65.380★

The Chemistry of Environmental Pollutants

This course focuses on specific pollutants of current interest. These may be inorganic (e.g., acid rain, lead, mercury) or organic (dioxins, PCBs, freons, pesticides, etc.). Discussion may include: their industrial sources; whether produced deliberately or accidentally; the use pattern; concentrations involved; their known effects on the environment and human health; chemistry involved in these effects; analytical methods to determine their concentration; current regulation of these compounds in Canada and elsewhere.

Prerequisite: Chemistry 65.220 or 65.280★.

To be offered first in 1992-93.

Chemistry 65.410★

Quantum Chemistry

Group theory applied to the determination of hybrid orbitals, molecular orbitals and molecular vibrations. Symmetry analysis of spectra, selection rules, allowed and forbidden reactions.

Prerequisite: Chemistry 65.311★ and 65.312★ or Physics 75.362★ or permission of the Department.

Day division, Fall term: Lectures and seminars three hours a week.

Chemistry 65.411★

Introduction to Statistical Thermodynamics

A course reviewing and extending the concepts covered in Chemistry 65.210, 65.311★ and 65.312★ by applying them to more advanced, practically oriented problems. The emphasis is on problems involving thermodynamics and statistical mechanics.

Prerequisite: Chemistry 65.311★ and 65.312★ or permission of the Department.

Day division, Fall term: Lectures and seminars three hours a week.

Chemistry 65.412★

Chemical Kinetics

Complex reaction sequences, numerical solution of kinetic equations. Descriptive kinetics, including photo-chemical reactions, chain reactions, explosions, feedback loops. Homogeneous and heterogeneous catalysis. Theoretical kinetics, including collision dynamics, activated complex theory, kinetics in solution.

Prerequisite: Chemistry 65.311★ and 65.312★ or permission of the Department.

Day division, Winter term: Lectures and seminars three hours a week.

Chemistry 65.413★

Colloid and Surface Chemistry

Properties and stability of colloidal systems, theories of

adsorption, heterogeneous catalysis, and interfacial phenomena.

Prerequisite: Chemistry 65.210 or permission of the Department.

Day division, Winter term: Lectures and seminars three hours a week.

Chemistry 65.420★

Physical Organic Chemistry

Molecular orbital calculations. Woodward-Hoffmann rules. Experimental and theoretical methods for determining reaction mechanisms. Linear free energy relationships. Mechanism problem-solving.

Prerequisites: Chemistry 65.321★ and 65.311★ or permission of the Department.

Day division, Fall term: Lectures and discussions three hours a week.

Chemistry 65.422★

Instrumental Analysis of Organic Compounds

Methods of analysis for, and structure determination of complex organic molecules. Topics include Fourier transform, infrared and ¹³C NMR spectroscopy, ultra violet spectroscopy, mass spectrometry and methods for relative and absolute stereochemical determination.

Prerequisite: Chemistry 65.321★ or permission of the Department.

Day division, Fall term: Lectures and seminars three hours a week.

Chemistry 65.423★

Synthetic Organic Chemistry

The application of reactions to the synthesis of organic molecules. Emphasis on design of sequences, new reagents and stereoselectivity.

Prerequisites: Chemistry 65.321★ and 65.322★ or permission of the Department.

Day division, Winter term: Lectures and seminars three hours a week.

Chemistry 65.430★

Electroanalytical Chemistry

Properties of ionic solutions, electrode processes, theory and application of electroanalytical techniques and reactions.

Prerequisites: Chemistry 65.230, 65.311★ and 65.312★ or permission of the Department.

Day division, Fall term: Lectures and seminars three hours a week.

Chemistry 65.431★

Trace and Ultratrace Analytical Chemistry

Sampling and sample preservation. The problems of the blank. Trace and ultratrace analysis. Analysis of ultrapur material. Atomic absorption, atomic fluorescence and atomic and molecular emission spectroscopy. Simultaneous and sequential multi-element analysis.

Prerequisites: Chemistry 65.210 and 65.230 or permission of the Department.

Given in alternate years with Chemistry 65.432★

Not offered 1990-91.

Chemistry 65.432★

Solutions and Separations in Analytical Chemistry

Complex formation, multi-step and competing equilibria and their application to the design of selective methods of separation and determination. Electroanalytical chemistry of aqueous solutions. Phase equilibria and solvent extraction.

Prerequisites: Chemistry 65.210 and 65.230 or permission of the Department.

Text: Laitinen and Harris, *Chemical Analysis, Second Edition*.

Day division, Winter term: Lectures and seminars three hours a week.

Given in alternate years with Chemistry 65.431★.

Chemistry 65.450★

Applications of Ligand Field Theory

Introduction to quantitative crystal field theory; the weak field approximation and application to heats of ligation; the strong field approximation and application to spectra and magnetism of inorganic compounds.

Prerequisites: Chemistry 65.311★ and 65.353★.

Day division, Winter term: Lectures and seminars three hours a week.

Chemistry 65.451★

Thermodynamic and Kinetic Aspects of Inorganic Chemistry

The course treats topics in solid state chemistry and solution chemistry. Applications in metallurgy and mineralogy receive attention.

Prerequisites: Chemistry 65.210, 65.353★ and 65.354★ or permission of the Department.

Day division, Winter term: lectures and seminars three hours a week.

Chemistry 65.452★

Radiochemistry

A study of nuclear stability and decay; chemical studies of nuclear phenomena. Applications of radioactivity.

Prerequisites: Chemistry 65.210, 65.230 and 65.353★ or permission of the Department.

Reference text: Friedlander, Kennedy, Macias and Miller, *Nuclear and Radiochemistry*.

Day division, Fall term: Lectures and seminars three hours a week.

Chemistry 65.480★

Atmospheric Chemistry

The topics to be covered in this course include: properties of the natural atmospheric constituents; biogeochemical cycles involving gases; chemical reactions in the atmosphere; anthropogenic atmospheric pollutants (e.g., chlorofluorocarbons, sulphur and nitrogen oxides, photochemical smog, etc.), their sources and their effects on the biosphere. Fundamentals of the structure of the relevant molecules are discussed to explain their spectral properties and chemical reactivities. Some fundamentals of gas properties are also included. Experimental methods for studying the atmosphere are covered briefly.

Prerequisite: Chemistry 65.210 or 65.280★.

To be offered first in 1993-94.

Chemistry 65.498

Research Project and Seminar

Senior students in Honours Chemistry carry out a research project under the direction of one of the members of the Department. A written report and an oral presentation of the work are required before a grade can be assigned.

Day division, Annually: Laboratory and associated work at least eight hours a week.

Courses Planned for Summer School 1991

65.100

Tory Building, Room 320
Telephone: 788-4400

required credits in the two major subjects as stated in the respective program requirements.

Officers of Instruction

Chairman

To be announced

Associate Chairman

To be announced

Professor Emeritus

F.K. North

Professors

K. Bell
R.L. Brown
G.Y. Chao
J.A. Donaldson
G. Ranalli
G.B. Skippen
W.M. Tupper
D.H. Watkinson
R.W. Yole

Associate Professors

J. Blenkinsop
F.A. Michel
R.P. Taylor

Assistant Professor

R.T. Patterson

Adjunct Research Professors

M.J. Drury, *Canadian Continental Drilling Program, Energy Mines and Resources Canada*
J.M. Franklin, *Geological Survey of Canada*
E. Froese, *Geological Survey of Canada*
S. Hanmer, *Geological Survey of Canada*
P.F. Hoffman, *Geological Survey of Canada*
C. Jefferson, *Geological Survey of Canada*
I. Jonasson, *Geological Survey of Canada*
R. Parrish, *Geological Survey of Canada*
J. Kukalova-Peck, *Department of Earth Sciences, Carleton University*
W. Shilts, *Geological Survey of Canada*

Instructor

I. Munro

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 349-350), in addition to all departmental regulations and requirements as set out below.

The designation of the Honours degree awarded for students in the Honours Geology program will be determined on the basis of their grade-point average for the ten and a half required credits of Geology as stated in the program requirements.

The designation of the Honours degree awarded for students in the Combined Honours programs will be determined on the basis of their grade-point average for all

Major Program

The B.Sc. program in Geology is of four years duration beyond Senior Matriculation or Qualifying University year. A total of 20 credits is required as follows:

1. The credit requirements of the First year of the general B.Sc. program (p. 346).

2. At least ten and a half credits in Geology, of which Geology 67.100, 67.221★, 67.222★, 67.228★, 67.233★, 67.234★, 67.281★, 67.282★, 67.323★, 67.324★, 67.333★, 67.334★ and 67.380 are mandatory. (Geology 67.100 may be taken either in Qualifying University or First year.)

Students who have taken Geology 67.105 (or 67.101, no longer offered) and attained a grade of B- or better may, with permission of the Department, substitute that course for 67.100.

3. At least six credits in the other sciences above Qualifying-University-year level. Among these, Mathematics 69.107★ and 69.117★, Chemistry 65.100, and one of Biology 61.102 (or 61.209★ and 61.230★) or Physics 75.100 or 75.105 are mandatory. At least three First-year Science credits must be passed before registration for Second-year Geology courses will be permitted, except that, if Geology 67.100 has been taken in Qualifying University year, a Second-year Geology credit may be substituted.

4. Two approved credits in Arts and/or Social Sciences.

5. One and a half credits chosen from Science, Arts, Social Sciences or Engineering.

A three-year program for students not intending to become professional geologists is also available. Requirements are the same as for the B.Sc. program outlined above except that Geology 67.282★ is not mandatory, no courses above the 300 series are required, and the total credits will number 15, including seven Geology credits; at least five Science credits outside of Geology, which must include Mathematics 69.107★ and 69.117★, Chemistry 65.100 and one credit from Biology 61.102 (or 61.209★ and 61.230★) or Physics 75.100 or 75.105; two Arts or Social Science credits and one optional credit.

A typical program is as follows:

First Year

Geology 67.100†;
Chemistry 65.100;
Physics 75.100 or 75.105 or Biology 61.102 (or 61.209★ and 61.230★);
Mathematics 69.107★, and 69.117★;
One credit (Arts or Social Science).
(†May be replaced by another Science credit if taken in Qualifying University year.)

Second Year

Geology 67.221★, 67.222★, 67.228★, 67.233★, 67.234★, 67.281★ and 67.282★;
One First- or Second-year Science credit;
One-half credit (Arts or Social Science).

Third Year

Geology 67.323★, 67.324★, 67.333★, 67.334★ and 67.380 (or 67.381★ and 67.382★);
One Second-year Science credit;

One-half credit (Arts, Social Science, Science or Engineering).

Fourth Year

Three Geology credits at the 400 level;

One Second-year Science credit;

One credit (Arts, Social Science, Science or Engineering).

Notes:

1. A working knowledge of elementary biology is required for Geology 67.234★ and 67.333★. This requirement may be fulfilled by credit for Grade 13 Biology, Biology 61.102 (or 61.209★ and 61.230★) or by arrangement with the instructor for extra reading assignments in Geology 67.234★.

2. All Major and Honours students should note that their selection of Science courses, including Mathematics, should be made with the prerequisites for subsequent Geology courses in mind.

3. Many Fourth-year courses are given in alternate years only. Fourth-year courses offered in the Department of Geology, University of Ottawa, are scheduled to alternate with those given at Carleton University. In 1990-91, some of the following Geology half credits, of which two may be taken for credit at Carleton, will be offered:

Geology

4123 Statistical Analysis in Geology

4192 Hydrogeology

4307 Permafrost Geomorphology

4310 Paleogeology

4330 Structural Geology II

4331 Tectonics

4344 Advanced Igneous Petrogenesis

4345 Metamorphic Petrology II

4350 Geochemistry I

4351 Geochemistry II

4360 Sedimentology I

4361 Sedimentology II

4370 Advanced Mineral Deposits

4. Third-year students possessing prerequisites may be admitted to Fourth-year courses with the permission of the Department.

5. Enrolment in 200-level courses may be restricted due to limited physical resources.

Honours Program

Faculty requirements concerning Honours standing must be maintained. (See p. 347.)

Honours In Geology

1. Courses as prescribed for the Major program are required, except that Geology 67.498 (Thesis) is one of the mandatory credits in Geology, and a credit in Mathematics beyond First-year level, and/or Computer Science is mandatory in the group of six credits required in other sciences. The Department recommends that students take Mathematics 69.257★ and Computer Science 95.103★ in order to fulfil this requirement.

2. The departmental language requirement must be met before completion of the Third year by passing a minimum of a formal half credit (e.g. French 20.106★) in, or demonstrating reading proficiency in, a language other than English, that is acceptable to the Department.

Combined Honours in Biology and Geology

Program advisers are R.T. Patterson and H. Howden.

Students desiring a comprehensive basic training in both biology and geology may apply for admission to a Combined Honours program, on completion of the First year of the Science program. Applicants must be of Honours standing and must have achieved grades of C+ or better in both Biology 61.102 (or 61.209★ and 61.230★) and Geology 67.100.

Course requirements of the Combined Honours program are as follows:

1. Biology 61.209★ and 61.230★ for students with OAC in Biology (61.102 if students do not have OAC in Biology), Geology 67.100, Mathematics 69.107★ and 69.117★. One of Chemistry 65.100, Physics 75.100 or 75.105. (The omitted subject, i.e. Chemistry or Physics, must have been taken at the Grade 13 level.);

2. Ten credits in Biology (or Biochemistry) and Geology beyond First-year level, including at least one half-credit field course. Not more than six credits in this group should be taken in one department and not more than six credits may be 200-level courses;

3. Biology 61.498 or Geology 67.498;

4. One half credit in Statistics and one half credit in Computer Science. (Mathematics 69.257★ and Computer Science 95.103★ are recommended);

5. Three optional credits, at least two of which must be acceptable credits offered by the Faculties of either Arts or Social Science;

6. A Science elective credit;

7. A language requirement must be met during the Third year by passing a course in, or demonstrating reading proficiency in, one of French, German, Russian, Spanish, Italian, Latin, Greek or any language acceptable to the committee and in which suitable arrangements can be made for the examination.

Combined Honours in Chemistry and Geology

Program advisers are C.L. Chakrabarti and G.B. Skippen.

A grade of C+ or better in both Chemistry 65.100 and Geology 67.100 and overall Honours standing are required for admittance to the program. Program requirements are as follows:

1. Chemistry 65.100, 65.210, 65.230, 65.353★, 65.354★ and one Chemistry credit at the 400 level;

2. Geology 67.100, 67.221★, 67.222★, 67.228★, 67.281★, 67.323★, 67.324★ and one Geology credit at the 400 level;

3. Chemistry 65.498 or Geology 67.498;

4. One Chemistry or Geology credit;

5. Mathematics 69.107★, 69.117★ and 69.202;

6. Physics 75.100;

7. Two Science credits, of which one must be outside Chemistry and Geology;

8. Two Arts or Social Science credits;

9. One elective credit;

10. A language requirement must be met during the Third year by passing a course in or demonstrating reading proficiency in one of French, German or Russian.

A typical program is as follows;

First Year

Chemistry 65.100;
Geology 67.100;
Mathematics 69.107★ and 69.117★;
Physics 75.100;
One Arts or Social Science credit.

Second Year

Chemistry 65.210 and 65.230;
Geology 67.221★, 67.222★, 67.228★ and 67.281★;
Mathematics 69.202.

Third Year

Chemistry 65.353★ and 65.354★;
Geology 67.323★ and 67.324★;
One Chemistry or Geology credit;
One Science credit;
One Arts or Social Science credit.

Fourth Year

Chemistry 65.498 or Geology 67.498;
One Chemistry credit at the 400 level;
One Geology credit at the 400 level;
One Science credit;
One elective credit.

Combined Honours in Geology and Physical Geography

Program adviser is F.A. Michel.

A grade of C+ or better in Geography 45.105/Geology 67.105 and overall Honours standing are required for admittance to the program. Program requirements are as follows:

1. Geology 67.105/Geography 45.105†, Chemistry 65.100, Mathematics 69.107★ and 69.117★, Physics 75.100 or 75.105.
2. Five credits in Geology beyond First-year level, including Geology 67.221★, 67.228★, 67.233★, 67.281★††, one half credit in Geology at the 200 level or above (students should choose this half credit with future course prerequisites in mind), one and a half credits in Geology at the 300 level or above, and one credit in Geology at the 400 level;
3. Five credits in Physical Geography beyond First-year level from list on pp. 000-000, including Geography 45.210★, one credit in Physical Geography at the 200 level or above, Geography 45.302★, 45.312★, 45.315★, 45.318★, 45.319★, one credit in Physical Geography at the 400 level;
4. Geography 45.496 or Geology 67.498;
5. One credit in Mathematics beyond the First-year level; and/or in Computer Science. (Mathematics 69.257★ and Computer Science 95.103★ are recommended.)
6. Two Arts or Social Science elective credits;†††
7. Two credits chosen from Arts, Social Science, Science or Engineering.

† Students who have taken Geology 67.100 may, with permission of the program advisers, substitute Geology 67.100 for Geology 67.105/Geography 45.105.

†† Geology 67.281★ precludes additional credit for Geography 45.299★.

††† A Human Geography course is recommended in the program.

Combined Honours in Physics and Geology

Program advisers are J. Blenkinsop and M.K. Sundaresan.

A grade of C+ or better in both Geology 67.100 and Physics

75.100 and overall Honours standing are required for admittance to the program. Program requirements are as follows:

First Year

Physics 75.100;
Geology 67.100;
Mathematics 69.107★ and 69.117★;
Chemistry 65.100;
One Arts or Social Science elective credit.

Second Year

Physics 75.211★, 75.222★, 75.235★ and 75.236★;
Geology 67.221★, 67.222★, 67.228★ and 67.281★;
Mathematics 69.202.

Third and Fourth Years

Three credits in Physics at the 300 level or above (not including the Honours Thesis), which must include one credit in the Third-year laboratory and at least a half credit at the 400 level;

Three credits in Geology (not including the Honours Thesis) chosen from Geology 67.323★, 67.324★, 67.333★, 67.334★, 67.380 and available Fourth-year courses. At least a half credit at the 400 level is required for which Geology 67.481★ is strongly recommended. (Students should carefully take note of course prerequisites when making their selection.);

Two optional credits (one credit in Computer Science is recommended);

One Arts or Social Science credit;

Honours Thesis (Physics 75.499 or Geology 67.498).

A reading proficiency in French, German or Russian must be demonstrated by the end of the Third year. The thesis must be presented and defended before an inter-departmental committee.

Combined Honours in Statistics and Geology

Program advisers is R.T. Patterson.

Designed for students of Honours standing desiring a comprehensive training in geostatistics, that is, the applications of statistical methods and techniques to geological problems. Program requirements are as follows:

First Year

Mathematics 69.102 and 69.117★;
Geology 67.100;
Chemistry 65.100; and one of Biology 61.102 (or 61.209★ and 61.230★), Physics 75.100 (or 75.105);
Computer Science 95.103★ (or 95.105★).

Second Year

Mathematics 69.208★, 69.217★, 69.257★, 69.259★;
Geology 67.221★, 67.222★, 67.228★, 67.233★, 67.281★;
One half credit free option (or Computer Science 95.106★, if 95.105★ was taken in First year).

Third and Fourth Years

Mathematics 69.244★, 69.350, 70.355★, 70.452★, 70.453★, and one half credit from: 69.304★, 69.381★, 69.386★.

Two of the following three blocks:

(a) Geology 67.323★, 67.324★;

(b) Geology 67.380;

(c) Geology 67.234★, and either 67.333★ or 67.334★.

One and a half credits in Geology at the 400 level.

Geology 67.498 Honours Thesis, or Mathematics 70.495★ Honours Project; and one additional half credit in Mathematics or Statistics at the 300 level or above.

Two credits (Arts or Social Science).

Graduate Courses

For information on graduate courses, please consult the Graduate Studies and Research Calendar.

Work-Study Program in Geology

This program allows students to gain professional experience while completing an academic degree. Admission

to the program requires departmental approval and is based on academic standing after completion of the First-year Science program. Applications should be made in January of the Second year. The Department will assist students in locating jobs that are related to career opportunities in geology but the Department cannot guarantee that such jobs will be available. The program is governed by the same academic regulations as regular B.Sc. programs in Geology. A typical program is shown in the table. Combined-Honours students should consult the appropriate advisers for their program in work-study.

	Year 1	Year 2	Year 3	Year 4	Year 5
<i>Fall</i>	67.100 65.100 69.107★ 69.117★ 61.102 or 61.209★ and 61.230★ or 75.100 or 75.105	67.221★ 67.233★ 67.281★ 1/2 credit Arts or Social Science 1 Credit 100- or 200-level Science	Work Term 3	67.323★ 67.333★ 67.381★ 1/2 credit 200-level Science 1/2 Credit Free Elective	2 credits Geology at 400 level 67.498 1 credit 200-level Science
<i>Winter</i>	1 credit Arts or Social Science	67.222★ 67.228★ 67.234★ 67.282★	67.324★ 67.334★ 67.382★ 1/2 credit 200-level Science 1/2 credit Arts or Social Science	Work Term 5	1 credit Free Elective
<i>Summer</i>	Work Term 1	Work Term 2	Work Term 4	Work Term 6	

Program Adviser: F.A. Michel

Courses Offered

Geology 67.100

Principles of Geology

The structure of the Earth's interior and tectonic processes; rocks, minerals and Earth resources; history of the Earth and its life. This course is designed for prospective Geology Majors and Science and Engineering students, but may be taken by students in other programs.

Precludes additional credit for Geology 67.105 or 67.101 (no longer offered).

Day division: Lecture two hours a week, tutorial one hour a week, laboratory three hours a week, two field excursions.

Geology 67.105

Introduction to Geoscience

A survey of processes operating within the Earth and at its surface: the hydrological cycle, oceans, Earth structure, tectonics, rocks, minerals, history of life on the Earth, climatic change, soils, landforms and resources. This course is designed for students who wish to understand the physical environment of the planet they inhabit. (Also listed as Geography 45.105.)

Precludes additional credit for Geology 67.100.

Day division: Lecture three hours a week, laboratory three hours a week, a field excursion.

Note:

Students wishing to continue in a Geology program may, with permission of the Department of Earth Sciences, substitute Geology 67.105 for Geology 67.100.

Geology 67.221★

Crystallography and Optical Mineralogy

Morphological study and classification of crystals; principles of optical crystallography.

Prerequisites: Geology 67.100 or 67.105 and Chemistry 65.100, or permission of the Department.

Day division, Fall term: Lectures two hours a week, tutorial one hour a week, laboratory three hours a week.

Geology 67.222★

Mineralogy

Introduction to crystal chemistry, X-ray techniques, physical mineralogy and systematic mineralogy.

Prerequisite: Geology 67.221★.

Day division, Winter term: Lectures two hours a week, tutorial one hour a week, laboratory three hours a week.

Geology 67.228★

Petrography and Geochemistry of Igneous Rocks

Introduction to the origin and classification of igneous rocks. Optical properties of the rock-forming minerals. Petrographic techniques and principles of geochemistry. Prerequisite: Geology 67.221★.

Day division, Winter term: Lectures two hours a week, tutorial one hour a week, laboratory three hours a week.

Geology 67.233★

Sedimentology and Stratigraphy I

Principles of stratigraphy and sedimentology, petrography of sedimentary rocks. One or more field excursions.

Prerequisite: Geology 67.100 or 67.105 or permission of the Department.

Day division: Lectures two hours a week, laboratory three hours a week.

Geology 67.234★

Palaeontology I

Principles of palaeontology and palaeoecology; organic evolution of invertebrates and vertebrates.

Prerequisite: Geology 67.100 or 67.105 or permission of the Department.

Day division: Lectures two hours a week, laboratory three hours a week.

Geology 67.238★

Earth, Resources and Society

This course is designed to enhance the students' appreciation of the resource basis of contemporary society, and to explain the role of the earth sciences in the forecasting and mitigation of natural disasters. Topics covered in the lectures include: non-renewable resources and the physical limits of a finite earth; energy, water and the human use of the oceans; earthquake prediction and control; volcanic eruptions; and several case histories. Students have the option to investigate and report on aspects of these problems that relate to their own disciplines.

Prerequisite: Geology 67.105 or permission of the Department.

To be offered first in 1991-92.

Geology 67.281★

Field Geology I

Basic geological methods applied to the field study of rocks. A mandatory two-week field camp before classes. Prerequisite: Geology 67.100 or 67.105 and permission of the Department.

Day division: Fall term: Field camp.

Geology 67.282★

Field Geology II

An introduction to methods of field analysis and interpretation in deformed and metamorphosed terranes. The course includes a two-week field camp to be taken in early May.

Prerequisite: Geology 67.281★ and permission of the Department.

Day division, Winter term: Lectures one hour a week, laboratory three hours a week, two-week field camp in early May.

Geology 67.323★

Metamorphic Petrography and Petrology

Petrology of volcanic and metamorphic rocks; one day-long field trip.

Prerequisites: Geology 67.221★, 67.222★, 67.228★ and Chemistry 65.100.

Day division, Fall term: Lectures two hours a week, laboratory three hours a week.

Geology 67.324★

Mineral Deposits

Geology, economic geology, and applied chemistry of ore deposits; hydrothermal fluids. One day-long field trip.

Prerequisites: Geology 67.221★, 67.222★, 67.228★ and Chemistry 65.100.

Day division, Winter term: Lectures two hours a week, laboratory three hours a week.

Geology 67.325★

Physical Hydrogeology

An introduction to the principles governing the movement of groundwater through various geological materials. The exploration, development and use of groundwater as a resource by man, and groundwater-related geohazards are examined.

Prerequisite: Geology 67.233★ or permission of the Department.

To be offered first in 1992-93.

Geology 67.333★

Stratigraphic Palaeoecology

Principles of ecology and palaeoecology applied to the stratigraphic succession of fossil communities: evolutionary palaeoecology.

Prerequisite: Geology 67.234★ or permission of the Department.

Day division, Fall term: Lectures two hours a week, tutorial one hour a week, laboratory three hours a week.

Geology 67.334★

Sedimentology and Stratigraphy II

Stratigraphic analysis; sedimentary environments; sedimentary tectonics; systematic historical geology of North America.

Prerequisite: Geology 67.233★.

Day division, Winter term: Lectures two hours a week, laboratory three hours a week.

Geology 67.380

Structural Geology and Geodynamics

The geometry of the Earth's crust interpreted in the light of mechanical principles of deformation; rock mechanics; applications to geological mapping, exploration and resource development. The structure and composition of the interior of the Earth: lithosphere, mantle and core. Rheological properties of lithosphere and mantle. Plate tectonics: kinematics and dynamics.

Precludes additional credit for Geology 67.381★ and 67.382★.

Prerequisites: Geology 67.221★, 67.222★, 67.228★, 67.281★, or permission of the Department.

Day division: Lectures two hours a week, laboratory three hours a week.

Geology 67.381★

Structural Geology

The geometry of the Earth's crust interpreted in the light of mechanical principles of deformation; rock mechanics; applications to geological mapping, exploration and resource development. May not be taken by Geology Honours and Geology Major students, except those in the Work Study program.

Precludes additional credit for Geology 67.380.

Prerequisites: Geology 67.382★, or permission of the Department.

Day division, Winter term: Lectures two hours a week, laboratory three hours a week.

Geology 67.382★**Geodynamics**

The structure and composition of the interior of the Earth: lithosphere, mantle and core. Rheological properties of lithosphere and mantle. Plate tectonics: kinematics and dynamics. May not be taken by Geology Honours and Geology Major students, except those in the Work Study program.

Precludes additional credit for Geology 67.380.

Prerequisite: Geology 67.221★, 67.222★, 67.228★, 67.281★.

Day division, Fall term: Lectures two hours a week, laboratory three hours a week.

Geology 67.383★**Gemmology**

Gem identification, occurrence, genesis, synthesis and evaluation. Testing instruments and techniques. Crystallographic, optical, physical and chemical properties of gemstones.

Prerequisites: Geology 67.221★ and 67.222★ or permission of the Department. Open to Science students with permission of their department, but not as a Science Continuation course.

Evening division, Fall term: Lectures and laboratories, five hours a week.

Geology 67.403★**Directed Studies In Geology**

One or more special projects based on a total of at least 15 days field research, laboratory investigations, or some combination of these components. Credit for field components may be accrued during the Third year of a student's program, but laboratory projects will be arranged during the Fourth year. Assessment to be based on written reports and oral examinations. Travel expenses for any long-distance travel are to be borne by student.

Prerequisites: Honours standing and permission of the Department.

Day division, Fall or Winter term.

Geology 67.415★**Quaternary Geography**

Offered in the Department of Geography as Geography 45.411★.

Lectures three hours a week, one term only.

Geology 67.417★**Geotechnical Mechanics**

Offered in the Department of Civil Engineering as Engineering 82.328★. (Also listed as Geography 45.424★.)

Geology 67.419★**Hydrology**

Offered in the Department of Civil Engineering as Engineering 82.441★. (Also listed as Geography 45.413★.)

Lectures two hours a week, problems, analyses three hours alternate weeks.

Geology 67.420★**Hydrogeology**

The principles governing the movement of groundwater through various geologic settings and the processes controlling chemical quality are examined. Study of the development and use of groundwater as a resource by man and the subsequent effects on water quality.

Prerequisites: Geology 67.233★, Chemistry 65.100 or permission of the Department.

Day division: Lectures, seminars and laboratories five hours a week.

Geology 67.421★**Ore Mineralogy**

Structural principles, crystal chemistry and classification of ore-forming oxides, sulfides, sulfosalts, uranium and precious-metal minerals. Principles of ore microscopy, analytical and identification techniques.

Prerequisite: Geology 67.324★.

Geology 67.422★**Metallic Mineral Deposits**

Ore deposits studied from their relationships to the petrologic cycle. Ore genesis interpreted in light of field studies of local deposits, reflected light microscopy of ore suites, description of classic deposits, phase equilibria and isotopic evidence.

Prerequisites: Geology 67.323★ and 67.324★.

Day division: Lectures, seminars and laboratories five hours a week.

Geology 67.423★**Petroleum Geology**

Occurrence and nature of petroleum; principles of petroleum geology; exploration and production, and evaluation methods; examples of oil and gas fields with emphasis on Canadian occurrences.

Prerequisite: Geology 67.334★.

Day division: Lectures, seminars and laboratories five hours a week.

Geology 67.425★**Geochemistry of Waters**

The principles and processes controlling the chemical quality of groundwater and the subsequent effects on water quality due to human activities. Isotope geochemistry of the hydrologic cycle and dissolved constituents in groundwater.

Prerequisites: Geology 67.325★ and Chemistry 65.100 or permission of the Department.

To be offered first in 1993-94.

Geology 67.427★**The Geology and Application of Coal**

The origin, structure, petrography and terminology of coal. Coal fields of North America with special reference to Canada. The evaluation, analysis, testing and application of coals. Extraction, utilization and beneficiation. Pollution. Economics.

Prerequisite: Geology 67.334★ or permission of the Department.

Evening division.

Geology 67.428★**Property Valuation and Mineral Economics**

Sampling, ore calculations, drilling and mining methods, property valuation, economics of specific mineral industries, national and international trade and mineral policies, taxation and financing of the mineral industry.

Prerequisite: Geology 67.324★ or permission of the Department.

Geology 67.431★**Marine Geology and Microfossils**

Oceanological and marine geological processes; micro-organisms of the oceans; microfossils: their evolution, biostratigraphic and palaeoecologic significance and economic use; microfossil correlation in petroleum geology. Laboratory: Examination and identification of microfossils. Each student is required to present at least one seminar paper.

Prerequisite: Geology 67.234★ or permission of the Department.

Day division: Lectures and laboratories five hours a week.

Geology 67.442★

Advanced Structure

A study of the structural evolution of mountain belts, with emphasis on field methods.

Prerequisite: Geology 67.380, or 67.381★ and 67.382★, or permission of the Department.

Day division: Lectures, seminars and laboratories five hours a week.

Geology 67.451★

Igneous Petrology

Genesis of plutonic and volcanic rocks, their spatial and petrochemical relationships and crust-mantle differentiation; associated problems in phase equilibria and isotopic studies. One day-long field trip.

Prerequisite: Geology 67.323★.

Day division: Lectures and laboratories five hours a week.

Geology 67.452★

Metamorphic Petrology

Field relations of metamorphic rocks; graphical treatment and interpretation of mineral assemblages. Laboratory: Petrographic techniques, study of rock suites.

Prerequisite: Geology 67.323★.

Geology 67.463★

Sedimentology

Review of sedimentary processes. Composition, texture, primary structure and origin of the major sedimentary rock types; dispersal patterns, sedimentary trends and lithofacies. Laboratory: textural analyses, heavy minerals, statistical analysis of data, and thin-section petrography.

Prerequisite: Geology 67.323★ or 67.334★.

Day division.

Geology 67.464★

Precambrian Geology

Introduction to problems of the Precambrian, emphasizing both classical and current North American studies. Laboratory: research methods, field trips, petrologic studies of representative rock suites.

Prerequisite: Geology 67.323★.

Geology 67.481★

Physics of the Earth

The physical properties of the solid earth. Gravitational, magnetic and palaeomagnetic fields; seismology and earthquake occurrence; heat flow and thermal history. Geodynamic processes.

Prerequisite: Geology 67.380, or 67.381★ and 67.382★, or permission of the Department.

Geology 67.482★

Geochemistry and Isotope Geology

Chemical evolution of the Earth, meteorites, development of the continental crust, origin of the atmosphere and hydrosphere, radiometric dating, stable isotopes, origin of life.

Prerequisites: Geology 67.323★ and 67.324★ or permission of the Department.

Day division: Lectures and seminars five hours a week.

Geology 67.483★

Applied Geochemistry

Chemical and physical factors responsible for the distribution and migration of the elements in the lithosphere, hydrosphere, atmosphere and biosphere; geochemistry applied to mineral exploration; methods of analysis. Laboratory: determination of trace amounts of the common metallic elements in soils and stream sediments; case histories, research problems, field trips.

Prerequisites: Geology 67.228★, 67.324★, Chemistry 65.100; or permission of the Department.

Day division.

Geology 67.484★

Exploration Geophysics

An introduction to the fundamental theory and application of geophysics to economic and structural geology. Methods studied are electrical, gravitational, magnetic, radioactive and seismic. Case history studies integrate the application of the methods.

Prerequisites: Geology 67.380, or 67.381★ and 67.382★, Physics 75.100 or 75.105; or permission of the Department.

Day division: Lectures and problems three hours a week.

Geology 67.487★

Field Geology III

A two-week field camp designed to develop the student's ability to observe, analyze and interpret geological field data in the light of theoretical and experimental knowledge. Written reports, including maps, sections and diagrams, are submitted during the course. Selected areas. A portion of the cost is borne by the student.

Prerequisite: Completion of the Geology core program or its equivalent, Geology 67.282★ and permission of the Department.

Geology 67.498

Honours Thesis

The B.Sc. thesis is to be based on a study undertaken before or during the final University year, in the field and/or the Department. Before registering in the course, the student must first have obtained approval of the topic from a supervisor and the course co-ordinator. The thesis is equivalent to one credit, with an average of eight hours work per week. It shall be defended orally; a final draft suitable for defence shall normally be submitted to the co-ordinator by the deadline for Winter term assignments.

Members of the Committee

H.G. Merriam, *Chair and Program Adviser*
B.R. Lifeso, Registrar, Faculty of Science
Other members to be announced

General Information

There is increasing concern throughout most of the world regarding the state of the environment, and interest in understanding the effect of human activity on the environment is widespread. Such a topic cannot be adequately addressed in any of the traditional discipline-based degree programs. Carleton University therefore offers a multidisciplinary program leading to an Honours degree in Environmental Science. This Bachelor of Science degree program has as a requirement a credit in Philosophy, and a relevant Social Sciences/Arts sequence is recommended. This requirement recognizes that the state of the environment is not simply a matter of science, but also includes consideration of economics, law, politics, philosophy, etc. The primary aim of the program is, nevertheless, to provide a solid grounding in those areas of science that are required to reach an understanding of the environment and how the actions of humanity affect it.

The first two years of the program are quite structured, to ensure that students receive a thorough grounding in those areas of science that are required to address environmental issues. The final two years of study leading to the Honours degree allow for a substantial degree of choice. The program must, however, be designed with a particular specialization in mind, and the choice of most of the course pattern must be done in consultation with the Program Adviser. The Honours Research Project (Environmental Science 62.496) is meant to give the student an opportunity to do some original research in the specialization developed through the course-pattern chosen in the Third and Fourth years.

A suitable sequence of two credits in Social Sciences/Arts is highly recommended. Students are advised to consult the Program Adviser about this at an early stage in the program.

Admission Requirements

The requirements are the same as those specified for the B.Sc. Honours degrees for the Faculty of Science (see p. 345).

Graduation

In order to graduate, students must fulfil all University regulations (see pp. 38-39) and all Faculty regulations (see pp. 349-350), in addition to the regulations established by the Environmental Science Committee.

Honours Program

Summary of Program Requirements

- 2.0 credits in Environmental Science: Environmental Science 62.150★, 62.359★, 62.496;
- 1.0 credit in Mathematics: Mathematics 69.107★, 69.257★;
- 3.0 credits in Geology and Geography: Geology 67.105/Geography 45.105, Geography 45.210★ and 45.211★, Geology 67.238★ and 67.281★;
- 2.0 credits in Chemistry: Chemistry 65.100, 65.231★ 65.280★;
- 2.0 credits in Biology: Biology 61.209★, 61.230★, 61.214★ (or 61.220★), 61.360★;
- 1.0 credit in Philosophy: Philosophy 32.184★, 32.284★;
- 2.0 credits in an appropriate Social Sciences/Arts sequence (of which up to 1.0 credit may be chosen from the list of courses otherwise not acceptable as Social Science electives for Science students (see p. 348.))
- 3.5 credits in approved Science courses (see below);
- 1.0 additional credit in approved Science courses at the 400 level (see below);
- 1.5 credits chosen in consultation with the Program Adviser;
- 1.0 credit, free elective.

Suggested Course Pattern

First Year

Mathematics 69.107★ and 69.257★
Geology 67.105/Geography 45.105 (or Geology 67.100)
Chemistry 65.100
Biology 61.209★ and 61.230★
Philosophy 32.184★
Environmental Science 62.150★

Second Year

Chemistry 65.280★ and 65.231★
Geography 45.210★ and 45.211★
Geology 67.281★ (to be taken in the Fall term before lectures commence) and 67.238★
Biology 61.214★ or 61.220★ (students intending to take microbiology, or higher-level courses in physiology should choose Biology 61.220★)
Free elective, 0.5 credit
Social Sciences/Arts elective, 1.0 credit (or Physics 75.100 or 75.105, see *Note* below)

Third Year

Environmental Science 62.359★
Philosophy 32.284★
Social Sciences/Arts elective (1.0 credit)
Biology 61.360★
Science credits (2.5 credits), which must be approved by the Program Adviser prior to registration (suggested courses are listed below)

Fourth Year

Environmental Science 62.496
Science credits (2.0 credits) including at least 1.0 credit at the 400 level, which must be approved by the Program Adviser prior to registration
2.0 additional credits: 0.5 free elective and 1.5 credits approved by the Program Adviser prior to registration.

Note:

If Physics 75.100 or 75.105 was taken in Second year, 1.0

Social Sciences/Arts elective must be taken in place of either 1.0 Science credit in the third year or 1.0 of the additional credits required in the fourth year.

Selected Courses Suitable for the Science Requirements of the Environmental Science Program

Biology 61.201★, 61.202★, 61.214★, 61.220★, 61.305★, 61.325★, 61.331★, 61.335★, 61.351★, 61.361★, 61.363★, 61.365★, 61.370, 61.381★, 61.391★, 61.413★, 61.414★, 61.415, 61.416★, 61.419★, 61.430★, 61.440, 61.447, 61.460, 61.461, 61.469★, 61.471★, 61.481★;
Chemistry 65.380★, 65.431★, 65.432★, 65.480★;
Computer Science 95.102★, 95.103★, 95.105★, 95.106★;
Geography 45.302★, 45.311★, 45.312★, 45.315★, 45.318★, 45.319★, 45.403★, 45.404★, 45.405★, 45.411★, 45.412★, 45.413★, 45.414★, 45.415★, 45.418★;
Geology 67.233★, 67.325★, 67.419★, 67.425★;
Mathematics and Statistics 69.117★, 69.259★, 69.357★;
Physics 75.100, 75.105, 75.291★, 75.292★, 75.424★;
Technology, Science, Environment Studies 59.401★, 59.402★

Comments Regarding Course Requirements

1. OAC Biology is a prerequisite for Biology 61.209★ but is not a requirement for entrance to the program. Students without OAC Biology will have to taken Biology 61.102 in First year, deferring one of the credits listed in the suggested course pattern.
2. The recommended Social Sciences/Arts sequence should be chosen in consultation with the Program Adviser. Upper-year courses of interest to students in Environmental Science usually require a First-year prerequisite; therefore this sequence may have to be started in Second year. Suitable sequences can be set up in Economics, Political Science/Law, Human Geography, Sociology, Anthropology, Mass Communication, etc.
3. One and a half credits in the Fourth year can be chosen from any department, but they must be suitable for the program of the individual student. The choice must also be made so that the regulations of the Faculty of Science for the B.Sc. degree (Major or Honours) (see pp. 345-351) are met.

Courses Offered

Environmental Science 62.150★

Environmental Science Seminar

This course introduces the elements of the natural and human-modified environment and discusses society's interest in environmental quality. The approach is by case studies in which the nature and extent of the requirement for scientific understanding of the elements of the natural environment and the processes by which human activities have an impact upon the environment are discussed.

Limited to students registered in the Environmental Science program.

Fall term: Lectures two hours a week, workshop two hours a week.

Environmental Science 62.359★

Group Project

The course consists primarily of a group project relating to an issue involving environmental science conducted under the supervision of a faculty member. Seminars discussing effective methods of team research, and oral and written presentation of results are included. The project involves the collection of data from the literature and/or from experi-

ments, the analysis of such data as they pertain to the aim of the project, and the preparation of one written and several oral reports. The course includes seminars on topics such as preparation of audiovisual presentations and effective report writing. Project groups and topics are assigned before the end of the Fall term.

Prerequisite: Registration in the Third year of in the Environmental Science program.

Fall term: occasional lectures and seminars.

Environmental Science 62.496

Honours Research Project

Students registered in the Fourth year of the Environmental Science program must carry out a research project under the supervision of a member of faculty. Normally, the choice of courses in Third year should have been made with a research topic for this project in mind. Approval of the topic and of the research schedule must be obtained from the project supervisor and the Program Adviser before the last day for late registration. Each student's performance is examined by a faculty committee after completion of the project, when a written report is to be submitted. An oral examination is also required. The written report must be submitted by the last day for submission of course assignments. Extensions of this deadline will be allowed only at the discretion of the Program Adviser.

Prerequisite: Registration in the Fourth year of the Environmental Science program.

Geography

Loeb Building, Room B349
Telephone: 788-2561

Officers of Instruction

Chairman
M.F. Fox

Supervisor of Honours Studies
M.W. Smith

Professors
J.P. Johnson, Jr.
J.K. Torrance (on leave)
P.J. Williams

Associate Professors
M.F. Fox
M.W. Smith
T.P. Wilkinson

Instructor
D. Patterson

Geotechnical Science Laboratories
L. Boyle
A. Pendlington

Adjunct Professors
G. Deecker
A. Judge
R.M. Koerner
A. Rencz

General Information

The Department of Geography, Faculty of Social Sciences, offers a full range of B.A. programs, in addition to the B.Sc. Honours programs described here. For details consult the Department's main entry in this Calendar, beginning on p. 135.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 349-350), in addition to all departmental regulations and requirements as set out below.

Honours Programs

B.Sc. in Physical Geography

The Bachelor of Science Honours program in Physical Geography is designed to give the student an understanding of the earth's surface as man's physical environment. The student will specialize in the study of properties and processes of the earth's surface materials and atmosphere.

Program Requirements

The program consists of 20 credits beyond Senior

Matriculation or Qualifying-University-year Science, selected in a pattern approved by the Supervisor of Honours Studies in the Geography Department, and consistent with the following requirements.

1. The First year of the program will be consistent with Faculty of Science requirements for First-year Science. (Note that Physics 75.100 or 75.105 is required in Second year if not taken in First year.)
2. The program will contain eight credits in Geography at or beyond the 200 level, including the Honours Research Project, Geography 45.496 which should be taken in the final year, and seven credits selected from the list below, of which at least two must be at the 300 level and at least two at the 400 level. These should include Geography 45.210★, 45.211★, 45.311★, 45.312★, 45.315★ and 45.318★. In special cases students may take an appropriate graduate course in their final year, with permission of the Supervisor of Graduate Studies.
3. The remaining seven credits must include:
 - (a) two approved credits in Science, not in Geography, beyond the 100 level; (Geology 67.233★ and 67.281★ are recommended);
 - (b) two approved credits in Science, Computer Science or Engineering;
 - (c) two Arts or Social Science elective credits, one of which must be an approved credit not in Geography;
 - (d) one free elective credit.

Physical Geography Courses

- 45.105 Introduction to Geoscience
- 45.204 Geographic Information and Analysis
- 45.210★ The Physical Environment
- 45.211★ Physical Basis of Environmental Management
- 45.302★ Air Photo Interpretation and Remote Sensing
- 45.303★ Quantitative Geography
- 45.304 Geographic Information Processing
- 45.307★ Cartographic Theory and Design
- 45.309★ Cartographic Production
- 45.311★ Biophysical Resource Assessment
- 45.312★ Geomorphology
- 45.315★ Climatology and Climatic Change
- 45.318★ Soil Properties
- 45.319★ Soils and Environment
- 45.400★ Field Studies
- 45.402★ Problems in Physical Geography
- 45.403★ Remote Sensing of the Environment
- 45.404★ Environmental Impact Assessment
- 45.405★ Field Studies in Environmental Assessment
- 45.408★ Geographic Information Systems
- 45.411★ Quaternary Geography
- 45.412★ Terrain Analysis
- 45.413★ Hydrology
- 45.414★ Microclimatology
- 45.415★ Earth Surface Materials
- 45.417★ Introductory Soil Mechanics and Engineering Geology
- 45.418★ Geocryology

Recommended Program Sequence

A recommended program is:

First Year

Mathematics 69.107★ and 69.117★;
Geography 45.105;
Two credits from: Biology 61.102 or 61.209★ and 61.230★,
Chemistry 65.100, Physics 75.100 or 75.105;
Arts or Social Science elective.

Second Year

Geography 45.204;
Geography 45.210★ and up to one full credit from the 300 level of the preceding list of approved Physical Geography courses;
Mathematics 69.257★;
Science elective or Physics 75.100 or 75.105 (required course in Second year if not taken in First year);
Arts or Social Science elective.

Third Year

Geography 45.311★ or 45.312★, 45.302★;
Geography 45.315★, 45.318★, with an additional half credit from the preceding list of approved Physical Geography courses;
One 400-level Geography credit;
One Science Continuation credit;
Arts or Social Science elective.

Fourth Year

Three 400-level Geography credits (including Geography 45.496);
One Science Continuation credit;
Free option.

Notes:

A Human Geography course is recommended as one of the Arts or Social Science electives.

Combined Honours B.Sc. in Biology and Physical Geography

Programs advisers are H.G. Merriam and P.J. Williams.

Students desiring a comprehensive basic education in both Biology and Physical Geography may apply for a Combined Honours B.Sc. program. Applicants must satisfy entry requirements of the Honours B.Sc. program. Course requirements of the Combined Honours B.Sc. program are as follows:

1. Biology 61.209★ and 61.230★, Geography 45.105, Mathematics 69.107★ and 69.117★, Chemistry 65.100.
2. Two optional credits which are acceptable courses offered in lieu of the Faculties of Arts or Social Sciences. A credit in Geography other than the Physical Geography courses listed on pp. 136-137, is recommended.
3. One additional Science credit from the list on p. 347. (Physics 75.100 or 75.105 is required unless Grade 13 Physics is presented as an entrance credit.)
4. One free option credit (unless Biology 61.102 is offered in lieu of the Ontario Academic Course in Biology. See Biology program for entry with and without Ontario Academic Course in Biology).
5. Ten credits in Biology (or Biochemistry) and Physical Geography (see courses listed on p. 381) beyond First-year level, including at least one half credit involving a field course. Not more than six credits in this group should be taken in one department and not more than six may be at the 200 level.
6. One additional credit in Science or Computer Science above the 100 level, not in Biology or Geography, and chosen in consultation with the student's program adviser.
7. Biology 61.498 or Geography 45.496.

Combined Honours B.Sc. in Geology and Physical Geography

Program advisers are F. Michel and P.J. Williams.

A grade of C+ or better in Geography 45.105 (Geology

67.105) and overall Honours standing are required for admittance to the program. Program requirements are as follows:

1. Geography 45.105† (Geology 67.105), Chemistry 65.100, Mathematics 69.107★ and 69.117★ and Physics 75.100 or 75.105;
2. Five credits in Geology beyond First-year level, including 67.221★, 67.228★, 67.233★, 67.281★††, one half credit in Geology at the 200 level or above (students should choose this one-half credit with future course prerequisites in mind), one and a half credits in Geology at the 300 level or above, and one credit in Geology at the 400 level;
3. Five credits in Physical Geography beyond the First-year level from list on p. 381, to include: Geography 45.210★, one credit in Physical Geography at the 200 level or above, Geography 45.302★, 45.312★, 45.315★, 45.318★ and one credit in Physical Geography at the 400 level;
4. Geography 45.496 or Geology 67.498;
5. One credit in Mathematics beyond the First-year level and/or in Computer Science. (Mathematics 69.257★ and Computer Science 95.103★ are recommended.)
6. Two Arts or Social Science elective credits†††;
7. Two credits chosen from Arts, Social Sciences, Science or Engineering.

†Students who have taken Geology 67.100 may substitute, with permission of the program advisers, Geology 67.100 for 67.105/45.105.

††Geology 67.281★ precludes additional credit for Geography 45.299★, no longer offered.

†††A Human Geography course is recommended in the program.

Graduate Program

The Department of Geography offers graduate programs in Physical Geography and Geotechnical Science. For further details consult the Graduate Studies and Research Calendar.

Courses Offered

Full details of all individual course offerings are presented in the Department of Geography submission in the Faculties of Arts and Social Sciences section of the Calendar, p. 135.

Integrated Science Studies

Members of the Committee

Chairman

I.S. Pressman (*Mathematics and Statistics*)
823 Dunton Tower 788-2165, 788-2155

Committee

D. Kessler (*Physics*)
B.R. Lifeso, *Registrar, Faculty of Science*
J. Neilson (*Computer Science*)
S. Peck (*Biology*)
J.K. Torrance (*Geography*)
R. Wightman (*Chemistry*)
R.M. Zacharko (*Psychology*)

General Information

The Integrated Science Studies (ISS) program offers undergraduate students in the Faculty of Science the opportunity to develop an individualized program that blends a concentration in Science with a linked area of specialization in another faculty. A student whose academic aspirations cannot be satisfied within the constraints of one of the many programs offered by the Faculty of Science may apply to the Integrated Science Studies program and describe the program that he or she would choose to pursue. If the proposal is intellectually coherent and satisfies the academic constraints of the Integrated Science Studies Program, the student will be admitted to ISS and will be permitted to follow the program that has been approved.

The program requires that a student select an area of concentration within Science: physical sciences, environmental sciences, life sciences, behavioural sciences, or mathematics and statistics, in order to acquire a depth of understanding of the particular discipline, its workings and its significance. In the associated specialty area outside of the Faculty of Science, a pattern of courses should be selected that provides the student with a concomitant, integrated understanding. Students are urged to be creative and bold in their planning, but should consult with a member of the ISS Committee for advice or assistance before applying for admission to the Integrated Science Studies program. A detailed list of the proposed courses and a description of the overall program must be submitted by every ISS applicant beyond First year. First-year students must submit their planned program to the ISS Committee before they commence their Second year. The Committee monitors the progress of all ISS students.

An Honours program and a Major program are available for ISS students. Both require a course of Independent Study as an important part of the program (Integrated Science 60.498, 69.399★).

This program is suitable for part-time students and mature students. Students in ISS may be eligible to transfer into co-op or work-study programs sponsored by other Departments in the Faculty of Science, provided they meet all the prerequisites and grade requirements. ISS students are advised to familiarize themselves with the particular rules of the Faculty of Science that apply to them.

Many different specific program combinations have been adopted in the past. Possible combinations available within the program are included here for illustrative purposes, but the following does not constitute an exhaustive list:

biology and psychology, e.g. neuroscience, nutrition plus behaviour;

biotechnology and business, e.g. genetic engineering and management;
chemistry/biochemistry and business, e.g. pre-pharmacy;
ecology and management, e.g. resource management, conservation;
environmental sciences (i.e. biology, chemistry, geography, earth sciences, physics, statistics), e.g. pollution, acid rain, climate studies, sustainable development;
geography, sciences and anthropology, e.g. archeological sciences;
life sciences (biology, chemistry, biochemistry) and social sciences, e.g. pre-medical studies, pre-dentistry;
operations research/mathematics and business, e.g. management science;
physical geography and civil engineering, e.g. soil sciences;
physics and psychology, e.g. perception;
physics and geography and computer science, e.g. remote sensing;
psychology and computer science, e.g. artificial intelligence, user interfaces;
science and engineering, e.g. bioengineering, instrumentation, ergonomics;
science and journalism, e.g. science writing, editing, reporting;
science and foreign languages/linguistics, e.g. translation, interpreting;
statistics and economics and business and law, e.g. actuarial sciences.

Admission Requirements

Application for admission to the program is made on an application form available from the Office of the Science Registrar. The admission requirements for these programs are those specified for the B.Sc. Major and Honours degrees (p. 345). Before seeking formal admission to the program, students are advised to consult with the Chairman for assistance in formulating an application proposal and a coherent set of courses that will meet the objectives of the student and fulfil Calendar requirements.

Course Requirements

First Year

The First-year program consists of five credits approved for a First-year Science program including:

- (a) Mathematics 69.107★ and 69.117★;
- (b) Two experimental Science credits chosen from two of: Biology, Chemistry, Geology, Physics;
- (c) Two additional credits chosen from Science, Mathematics, Arts, Social Sciences, Computer Science (except Computer Science 95.100★ or 95.101★) or Engineering.

In establishing their First-year program, students should consult with the Chairman of the Integrated Science Studies program or a member of the committee to ensure that they register for appropriate courses.

Major Program

Although programs are planned and approved on an individual basis, the general framework of regulations is specified. The program, under the direction of the Integrated Science Studies Committee, consists of 15 credits, ten beyond First year including:

1. Six credits selected from the Faculty of Science above the 100 level, including Integrated Science 60.399★; two of the Science credits must be at the 300 or 400 level; the foregoing credits are designated as the Science sequence;

2. Three credits in an inter-related specialized area selected from outside the Faculty of Science; these credits are designated as the Non-Science sequence.

At least two credits must also be chosen from the Faculties of Arts or Social Sciences.

At least eight credits must also be at the 200 or higher level. In this program, all Technology, Society, Environment Studies courses are considered Non-Science credits.

Honours Program

The program, under the direction of the Integrated Science Studies Committee, consists of 20 credits, 15 beyond First year including:

1. Nine credits selected from the Faculty of Science above the 100 level, including Integrated Science 60.498; four of the Science credits must be at the 300 or 400 level; the foregoing courses are designated as the Science sequence;

2. Four credits in an inter-related specialized area selected from outside the Faculty of Science; these credits are designated as the Non-Science sequence.

At least two credits must also be chosen from the Faculties of Arts or Social Sciences.

At least thirteen credits must be at the 200 or higher level. In this program, all Technology, Society, Environment Studies courses are considered Non-Science credits.

Graduation

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 349-350), in addition to the Committee regulations and requirements.

Major Program

To qualify for graduation a student must satisfy the normal requirements of the Faculty and have grade-point averages of 4.0 or better in the Science sequence (six credits), the Non-Science sequence (three credits), and overall (15 credits). The last five credits taken normally will include at least one credit from each of the Science and Non-Science sequences.

The general Faculty of Science regulations apply for graduating "with Distinction" (see p. 350).

Honours Program

To qualify for graduation a student must satisfy the normal requirements of the Faculty and have grade-point averages of 6.5 or better in both the Science sequence (nine credits) and the Non-Science sequence (four credits) as well as an overall grade-point average of 5.0 or better (20 credits). The class of Honours degree will be determined following general Faculty regulations (pp. 350-351) using all 13 credits in the Science and Non-Science sequences to calculate the Honours grade-point average.

Courses Offered

Integrated Science 60.399★

Independent Study

The student must have the agreement of a member of the University faculty to supervise the project. The student is responsible for filing an outline of the proposed project (which includes an indication of the methods to be used, and which has been written in consultation with the adviser), with the Integrated Science Studies Chairman not later than three weeks after registration in the course. A final report must be prepared and submitted in two copies, one to the project adviser and one to the Chairman of the Committee, by the last day of classes of the term in which the student is registered. This course is normally open only to Integrated Science Studies students. Students must demonstrate the integrative or interdisciplinary nature of their proposed study.

Prerequisite or co-requisite: At least one half-credit at the 300 level or better and permission of the Committee. Fall and Winter terms.

Integrated Science 60.498

Honours Project

A project is carried out by the student in consultation with a faculty adviser. The project must be approved by the adviser's department and by the Chairman of the Integrated Science Studies program. A written outline of the proposed study, approved by the adviser, must be submitted to the Chairman of the Committee not later than three weeks after registration in the course. A progress report must be submitted to the adviser and the Chairman by the first day of classes in the Winter term. Three copies of the final written report shall be prepared and submitted by the last day of Winter term classes, one each for the project adviser, an Integrated Science Studies Committee member, and a third reader, who has some familiarity with the project area. An oral report normally will be required at the conclusion of the project. The project is the equivalent of one credit, with an average of eight hours of work per week. An "In Progress" grade will not be given for work not meeting the deadlines except in unusual circumstances and with the approval of the Committee Chairman. The fulfilment of these requirements is the responsibility of the student.

Dunton Tower, Room 710
Telephone: 788-2155
Undergraduate Adviser: 788-2150

Officers of Instruction

Chairman

C.W.L. Garner

Director, Institute for Graduate Studies and Research in Mathematics and Statistics
To be announced

Undergraduate Adviser

K. Small

Professor Emeritus

M.S. Macphail

Professors

M. Chacron

M. Csörgö

W.H. Cunningham

D.K. Dale

D.A. Dawson

J.D. Dixon

V. Dlab

C.W.L. Garner

J.E. Graham

E.O. Kreyszig

A.B. Mingarelli

L.D. Nel

J.N. Pandey

B.M. Puttaswamaiah

M. Rahman

J.N.K. Rao

L. Ribes

A.K. Md. E. Saleh

H.H. Schirmer

W.J. Schneider

K.S. Williams

Associate Professors

A. Bose

C.K. Fong

K. Hardy

R.M. Herz-Fischler

A.B.M.L. Kabir

L.E. May

S.E. Mills

M.J. Moore

B.C. Mortimer

E.J. Norminton

J.C. Poland

I.S. Pressman

R.B. Richter

A. Smith

G.K. Zelmer

Assistant Professors

M.J. MacLeod

S. Melkonian

R.R. Sitter

Natural Sciences and Engineering Research Council Research Fellow

B.C. Mortimer

Research Consultant in Computer Science
M.D. Atkinson

Adjunct Research Professors

F.P. Agterberg (*Energy, Mines and Resources Canada*)

T. Hida (*Nagoya University, Japan*)

D. Krewski (*Health and Welfare Canada*)

P. Mandl

P. Révész (*Academy of Sciences, Hungary*)

A.B. Singh (*Statistics Canada*)

M.B. Wilk (*Privy Council Office*)

Sessional Lecturers

M. Binns

M. Hurd

P. Mandl

C. McGill

A. Woodside

Departmental Administrator

S. Dahabieh

Programs in Mathematics and Statistics

The Department of Mathematics and Statistics offers a wide variety of programs ranging from those giving a strong training in the theoretical aspects of mathematics and statistics to those which emphasize applications to industry and government.

The Department offers both Major and Honours programs leading to either the B.A. or the B.Sc. degree. The following is a list and short description of the programs which are available:

Mathematics (Major and Honours B.A. and B.Sc.)

The Major programs are generally less theoretical than the Honours programs which may form an excellent introduction to graduate studies. The main areas of concentration are: algebra, analysis, topology, applied mathematics (classical and modern), statistics and probability.

Computer Mathematics (Major and Honours B.A. and B.Sc.)

The programs in computer mathematics are designed to provide a student with a background of computer-related mathematical ideas together with a firm base of computer science. These programs are of interest to students who are preparing for careers in government, industry, management, or systems analysis.

Statistics (Major and Honours B.A. and B.Sc.)

The Major program (B.A. or B.Sc.) in Statistics provides the academic groundwork for employment opportunities at the junior methodologist level, in a variety of statistics-related fields. The Honours program (B.A. or B.Sc.) is designed primarily for a student who wishes to prepare for a career as a professional statistician.

The following Combined Honours programs may be of particular interest:

Economics and Mathematics (Honours B.A.)

Mathematics and Philosophy (Honours B.A.)

Computer Science and Mathematics (Honours B.Sc.)

The Combined Honours program in Computer Science and Mathematics is a limited-enrolment program resembling

the Bachelor of Computer Science program, placing equal emphasis on computer science and mathematics. There are two options available for concentration, namely:

Computing Theory and Numerical Methods
Statistics and Computing

Geology and Statistics (Honours B.Sc.)

Mathematics and Physics (Double Honours B.Sc.)

Operations Research (Honours B.A. and B.Sc.)

This program is devoted to the professional discipline which deals with the scientific aspects of planning and decision-making. (See p. 401.)

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (Arts and Social Sciences, see pp. 65-66; Science, see pp. 349-350) in addition to all departmental regulations and requirements as set out below.

Note:

For students in Honours programs:

The designation of Honours degree will be determined by the student's grade-point average on all required credits in the Honours subjects, as stated in the program requirements; however, the Department may use discretion in counting the number of Honours credits, where students have more than the minimum number of required credits.

For students in the Combined Honours programs:

The designation of Honours degree will be determined by the student's grade-point average on all required credits in the two Honours subjects, as stated in the respective program requirements; however, the departments may use discretion in counting the number of Honours credits, where students have more than the minimum number of required credits.

For students in the Double Honours program in Mathematics and Physics:

The designation of Honours degree will be determined by the grade-point average on all required credits in the two Honours subjects, as stated in the program requirements.

First-Year Course Selection

1. Mathematics 69.102, 69.112 (students in the Faculties of Arts, Social Sciences or Science). This choice is required of students in First year who are in a Mathematics program;
2. Fall term: Mathematics 69.104★; Winter term: Mathematics 69.114★ (students in the Faculty of Engineering or in the School of Computer Science)
3. Fall term: Mathematics 69.107★; Winter term: Mathematics 69.117★ (students in the Faculty of Science);
4. Mathematics 69.102; Fall term: Mathematics 69.117★ (students in the Faculty of Science);
5. Fall term: Mathematics 69.107★, 69.117★; Winter term: Mathematics 69.207★, 69.217★ (students in the Faculties of Arts, Social Sciences or Science);
6. Fall term: Mathematics 69.109★; Winter term: Mathematics 69.119★ (students in the School of Business, Department of Economics or in other Arts or Social Sciences departments).

Notes:

1. Credit will only be given for one of: Mathematics 69.102, 69.104★, 69.107★; and one of: Mathematics 69.112, 69.114★, 69.117★, 69.119★, 69.127★ (no longer offered).

2. In the prerequisites listed for more advanced courses, Mathematics 69.117★ may be replaced by "69.119★ with directed reading."

Major Programs: B.A. and B.Sc.

Core Requirements

The requirements given below are common to all Major programs in the Department of Mathematics and Statistics.

In certain cases the Department may permit a student to replace courses listed in the 69 series by the corresponding Honours (70 series) courses.

Each Major program requires a total of 15 credits, including:

- Mathematics 69.102, 69.112 with an average grade of C- or better.

Alternatively, students may be admitted to a Major program in Mathematics after successful completion of First year with:

- (a) a minimum grade-point average of 5.0 (C) on all half credits offered from: Mathematics 69.107★, 69.207★, 69.117★, 69.217★; and
- (b) a minimum weighted grade-point average of 4.0 (C-) on all courses offered from: Mathematics 69.102, 69.107★, 69.207★, 69.112, 69.117★, 69.217★.

Note:

Students offering Mathematics 69.107★ must then take Mathematics 69.207★, and students offering Mathematics 69.117★ must then take Mathematics 69.217★.

- For the B.A. Program:

Two credits at the 200 level or above in the Faculties of Arts or Social Sciences.

- For the B.Sc. Program:

Two Science Continuation credits are required (in addition to the First-year experimental science requirement). Certain Computer Science courses required in specific programs may be counted towards this requirement. However, Computer Science courses that are cross-listed with Mathematics courses are not acceptable as Science Continuation courses. Acceptable courses and exceptions are noted on p. 347.

Two Arts or Social Science elective credits. Concerning Social Science electives, see the note on p. 348.

- In each program, the remaining courses may be chosen from any department, including Mathematics and Statistics, subject only to the restriction that of the total of 15 credits not more than seven may be below the 200 level.

Course requirements for Major programs:

Mathematics (Major B.A. and B.Sc.)

This program requires a minimum of seven credits in mathematics.

Course requirements for this program are:

1. core requirements (see this page);
2. Mathematics 69.208★, 69.218★, 69.244★, 69.257★.
3. three credits in Mathematics selected from the range

69.304★ to 69.389★, excluding 69.311★, 69.352★, 69.375★ and 69.376★.

With permission of the Department, one or more of the courses in requirement 3 may be replaced by a course in the 70 series at the 300 or 400 level, provided that of the total of three credits, not more than two are in the same area.

Note:

Students wishing to specialize in *Applied Analysis* may, with the permission of the Department, replace requirements 2 and 3 in the Mathematics degree requirements by:

2. Mathematics 69.208★, 69.244★, 69.257★;
3. Mathematics 69.304★, 69.307★, and one of Mathematics 69.344★, 69.381★, 69.386★, or Physics 75.381★;
4. one additional credit in Mathematics at the 300 level, excluding 69.311★ and 69.352★;
5. one additional credit at the 200 or 300 level chosen from Mathematics or Computer Science.

Students specializing in *Applied Analysis* are encouraged to include at least one and a half credits in Computer Science in their program.

Computer Mathematics (Major B.A. and B.Sc.)

This program requires a minimum of ten credits in Mathematics and Computer Science. Computer Science 95.100★ and 95.101★ are not acceptable in this program, even as free options.

Course requirements for this program are:

1. core requirements (see p. 386);
2. Computer Science 95.102★, 95.105★, 95.106★, 95.202★;
3. Mathematics 69.208★, 69.218★, 69.257★;
4. Mathematics 69.384★, 70.385★, and at least one of Mathematics 69.381★, 69.386★;
5. one additional credit in Mathematics at the 300 level, excluding 69.311★ and 69.352★;
6. one additional credit in Computer Science (95 series) at the 200 level or above;
7. one additional credit at the 200 or 300 level in Mathematics or Computer Science.

Note:

In special cases Computer Science 95.103★ (or 95.104★, no longer offered) may replace 95.105★, although only one of 95.103★, 95.104★ or 95.105★ can be counted for credit in the Computer Mathematics program.

Statistics (Major B.A. and B.Sc.)

This program requires a minimum of six credits in Mathematics and Statistics.

Course requirements for this program are:

1. core requirements (see p. 386);
2. Mathematics 69.208★, 69.257★, 69.259★;
3. Mathematics 69.350, 69.353★, 69.354★, 69.357★;
4. one additional credit at the 200 level or above chosen in a relevant topic from courses offered by the Faculty of Science, the School of Computer Science or the Faculty of Social Sciences. This credit is in addition to the Science Continuation credits required in the B.Sc. program and the Arts and Social Science credits (200-level or above) required in the B.A. program.

Students majoring in Statistics are urged to include at least one full credit in Computer Science in their program. Students are advised to consult the School of Computer Science regarding the most appropriate courses.

Combined Pass Programs: B.A.

Programs are arranged in consultation with the Department of Mathematics and Statistics and another department in the Faculties of Arts or Social Sciences.

Combined Pass Program with Mathematics

In general, the Mathematics requirements are the same as those listed under the Mathematics B.A. program (see pp. 386-387), except that only two credits are required instead of three under requirement 3.

Combined Pass Program with Statistics

In general, the Statistics requirements are the same as those listed under the Statistics B.A. program (see this page), except that:

- i. under requirement 3, Mathematics 69.350 and 69.353★ are required as well as one of Mathematics 69.354★ and 69.357★;
- ii. under requirement 4, only one half-credit is required.

Honours Programs: B.A. and B.Sc.

Core Requirements

Prospective Honours students should note that the courses Mathematics 69.102, 69.112, 70.200 and 70.210 provide more than just the basic mathematical techniques; they also provide training in rigorous mathematical thinking and, as such, are basic to the Honours Mathematics programs.

The core requirements for the Honours programs in Mathematics, Computer Mathematics, and Statistics, are as given below.

In certain cases the Department may permit a student to replace a course at the Fourth-year level by a graduate course.

Each Honours program requires a total of 20 credits including:

- Mathematics 69.102, 69.112 with an average grade of C+ or better.

Alternatively, students may be admitted to an Honours program in Mathematics after successful completion of First year with:

- (a) a minimum grade-point average of 7.0 (B-) on all half credits offered from: Mathematics 69.107★, 69.207★; 69.117★, 69.217★; and
- (b) a minimum weighted grade-point average of 6.0 (C+) on all credits offered from: Mathematics 69.102, 69.107★, 69.207★; 69.112, 69.117★, 69.217★.

Notes:

- (a) Students offering Mathematics 69.107★ must then take Mathematics 69.207★, and students offering Mathematics 69.117★ must then take Mathematics 69.217★.
- (b) Knowledge of a computer language is required for Mathematics 70.260.

- Mathematics 70.200, 70.210, 70.260.

• **Mathematics 70.495★** (Honours Project). The Honours Project in Mathematics consists of a written report on some approved topic or topics in the field of Mathematics together with a short lecture on the report. Each student should commence work on the project under a faculty supervisor before June 1 of the year before he or she intends to graduate (for full-time students, this would be the June 1 between Third and Fourth Year.) The first draft of the report must be submitted to the supervisor by November 1, and the final draft to the Department by January 15. Students who do not meet this latter deadline will be given the grade **FNS**.

• For the **B.A. program**:
Two credits at the 200 level or above in the Faculties of Arts or Social Sciences.

• For the **B.Sc. program**:
Two Science Continuation credits are required (in addition to the First-year experimental science requirement). Certain Computer Science courses required in specific programs may be counted towards this requirement. However, Computer Science courses that are cross-listed with Mathematics courses are not acceptable as Science Continuation courses. Acceptable courses and exceptions are noted on p. 347.

Two Arts or Social Science elective credits. Concerning Social Science electives, see the note on p. 348.

• In each program, the remaining courses may be chosen from any department, including Mathematics and Statistics, subject only to the restriction that of the total of 20 credits, not more than seven may be below the 200 level.

Course Requirements for Honours Programs:

Mathematics (Honours B.A. and B.Sc.)

This program requires a minimum of 11 credits in Mathematics.

Course requirements for this program are:

1. core requirements (see p. 386);
2. **Mathematics 70.301★, 70.307★, 70.310**, and at least one of **70.302★** or **70.308★**;
3. three additional half credits in Mathematics (70 series) at the 300 level or above;
4. three additional half credits in Mathematics (70 series) at the 400 level or above.

Note:

It is strongly recommended that **Mathematics 70.301★** be taken in the Third year.

Students wishing to specialize in *Applied Analysis* may, with permission of the department, replace items 2, 3, and 4 in the Mathematics degree requirements by:

2. **Mathematics 70.302★, 70.307★, 70.308★, 70.346★, 70.356★**, and 1.0 credit from **Mathematics 69.381★, 69.384★, 69.386★**, and Honours courses in Mathematics (70 series) at the 300 level or above;
3. **Mathematics 70.470★**, at least one of **70.471★, 70.472★**, and one additional half credit in Mathematics at the 400 level;
4. one additional half credit, chosen from Computer Science (95 series, 200 level or above) or from Mathematics (70 series, at the 300 level or above).

Students wishing to specialize in *Stochastics* may, with

permission of the Department, replace items 2, 3, and 4 in the Mathematics degree requirements by:

2. **Mathematics 70.301★, 70.308★, 70.350, 70.356★** and one of **70.355★, 69.381★**;
3. **Mathematics 70.451★**, and one half credit selected from the range **70.450★** to **70.459★**;
4. one credit in Mathematics at the 400 level or above;
5. one additional half credit chosen from Computer Science (95 series, 200 level or above) or from Mathematics (70 series or **69.384★, 69.386★**).

Students specializing in *Applied Analysis* or *Stochastics* are encouraged to include at least one and a half credits in Computer Science in their programs.

Computer Mathematics (Honours B.A. and B.Sc.)

This program requires a minimum of 14 credits in Mathematics and Computer Science. Computer Science 95.100★ and 95.101★ are not acceptable in this program, even as free options.

Course requirements for this program are:

1. core requirements (see p. 386);
2. Computer Science **95.102★, 95.105★, 95.106★, 95.202★**;
3. **Mathematics 70.301★, 69.384★**;
4. **Mathematics 70.310**, or **Mathematics 70.385★** and **69.381★**;
5. one credit from **Mathematics 69.304★, 69.381★, 69.386★** and courses in the range **Mathematics 70.302★** and above;
6. **Mathematics 70.350**, or **Mathematics 69.257★** and **70.356★**;
7. **Mathematics 70.484★, 70.486★**;
8. one half credit from **Mathematics 70.482★, 70.483★, 70.485★, 70.488★**, or an approved half credit at the graduate level (70.580 series);
9. one additional credit in Computer Science at the 200 level or above.

Note:

In special cases Computer Science **95.103★** (or **95.104★**, no longer offered) may replace **95.105★**, although only one of **95.103★, 95.104★, 95.105★** can be counted for credit in the Computer Mathematics program.

Statistics (Honours B.A. and B.Sc.)

This program requires a minimum of 11 credits in Mathematics and Statistics. The program is of particular interest to a student wishing to pursue a career as a professional statistician.

Course requirements for this program are:

1. Core requirements (see p. 386; **Mathematics 70.210** may be deferred until Third year);
2. **Mathematics 69.257★, 69.259★**;
3. Computer Science **95.105★** (or **95.103★**), **95.106★**;
4. **Mathematics 70.350, 70.355★, 70.356★, 69.386★**;
5. **Mathematics 70.450★**, and 1.5 credits from the range **Mathematics 70.451★** to **70.459★**.

Combined Honours Programs: B.A. and B.Sc.

Economics and Mathematics (Honours B.A.)

This program requires a minimum of 6.5 credits in Economics and 8.5 credits in Mathematics, plus either Economics 43.220 or Mathematics 69.257★ and 69.259★. All course selections must be approved by the Department of Mathematics and Statistics and the Department of Economics.

Course requirements for this program are:

1. Mathematics 69.102, 69.112 (or their equivalents);
2. Mathematics 70.200, 70.210, 70.260; either Economics 43.220, or Mathematics 69.257★ and 69.259★;
3. Mathematics 70.301★, 70.350, at least one of 70.302★ or 70.308★, and one additional half credit in Mathematics at the 300 or 400 level;
4. one additional credit in Mathematics at the 400 level;
5. the Economics requirements as given on p. 106.

Mathematics and Philosophy (Honours B.A.)

This program requires a minimum of seven credits in Philosophy and nine credits in Mathematics. All course selections must be approved by the Department of Mathematics and Statistics and the Department of Philosophy.

Course requirements for this program are:

1. Mathematics 69.102, 69.112 (or their equivalents);
2. Mathematics 70.200, 70.210, 70.260, 70.301★, 70.310, and at least one of 70.302★ or 70.308★;
3. one additional credit in Mathematics at the 300 or 400 level;
4. one additional credit in Mathematics at the 400 level.
5. For the requirements in Philosophy, consult the Honours supervisor in the Department of Philosophy.

Other Combined Programs (Honours B.A.)

Other Combined Honours programs such as German and Mathematics, Geography and Mathematics are available. Please consult the Department of Mathematics and Statistics for full details.

Computer Science and Mathematics (Honours B.Sc.)

This program is administered by the Committee on Combined Programs with Computer Science (CCPCS); the Committee consists of representatives from the School of Computer Science, the Department of Physics, and the Department of Mathematics and Statistics.

Enrolment in this program is limited. Applicants should note that meeting the minimum published requirements for admission to this program does not imply automatic acceptance.

Applications for admission to this program will only be processed by the Committee during the periods mid-May to mid-June, and mid-August to mid-September each year.

Continuation in the Program:

To continue in the program, a student must:

- (a) by the end of August each year, have gained at least one half credit in the past 12 months towards the degree requirements, and
- (b) have accumulated a grade-point average of 6.5 or better in each of Computer Science and Mathematics, and

a grade-point average of 5.0 or better overall. (Grade-point averages are to include any failing grades that have not yet been replaced by a passing grade in the same or a substitute course.)

Failure to comply with these standards requires withdrawal from the program.

This program requires a minimum of 15 credits in Computer Science and Mathematics, placing equal emphasis on both these disciplines. Students may choose one of two options which serve as areas of concentration. All course selections must be approved both by the Department of Mathematics and Statistics and the School of Computer Science. A total of 20 credits is required in accordance with the conditions given below.

Note:

Some courses offered by the School of Business and the Department of Systems and Computer Engineering may be taken for credit as Computer Science courses in this program. For a complete list of these courses see p. 278.

Core Requirements (10 credits in Mathematics and Computer Science):

1. Mathematics 69.102, 69.117★; Computer Science 95.102★, 95.105★, 95.106★;

Note:

Students who wish to keep open the choice of other Honours programs in Mathematics and Statistics are advised to take Mathematics 69.112 instead of 69.117★ (and 69.217★).

2. Mathematics 70.200, 69.217★; Computer Science 95.202★, 95.203★, 95.204★ and 95.304★;
3. Mathematics 70.210; Computer Science 95.300★, 95.305★, 95.384★, 95.385★; Mathematics 70.495★ or Computer Science 95.495★.
4. one First-year Experimental Science credit. Two credits in Arts or Social Sciences. Concerning Social Science electives, see the note on p. 348.
5. two free option credits, subject only to the requirement that of the total of 20 credits, not more than seven may be below the 200 level.

Candidates must also satisfy the requirements of one of the following two options: (Each option contains five credits in Computer Science and Mathematics.)

Option: Computing Theory and Numerical Methods (CTNM)

1. Mathematics 70.260;
2. Mathematics 69.381★, 69.386★ and one of Mathematics 70.301★, 70.302★, 70.307★, 70.308★;
3. Mathematics 70.484★, and one credit from Mathematics 70.482★, 70.483★, 70.485★, 70.486★, 70.488★;
4. one additional credit in Computer Science at the 300 level or above.

Option: Statistics and Computing (STC)

1. Mathematics 69.257★, 69.259★; 69.265★ (or 70.260) (must be taken in Second year);
2. Mathematics 70.350, and at least one of 70.355★, 70.356★;
3. one credit in Mathematics from the range Mathematics 70.450★ to 70.459★;
4. one credit in Computer Science at the 400 level.

Geology and Statistics (Honours B.Sc.)

This program requires a total of 20 credits including 15 credits in geology and mathematics.

Course requirements for this program are:

First Year

1. Mathematics 69.102, 69.117★;
2. Geology 67.100;
3. Chemistry 65.100, and one of Biology 61.102 (or 61.209★ and 61.230★), Physics 75.100 (or 75.105);
4. Computer Science 95.103★ (or 95.105★).

Second Year

1. Mathematics 69.208★, 69.217★, 69.257★, 69.259★;
2. Geology 67.221★, 67.222★, 67.228★, 67.233★, 67.281★;
3. one half credit free option (or Computer Science 95.106★, if 95.105★ was taken in First year).

Third and Fourth Years

1. Mathematics 69.244★, 69.350, 70.355★, 70.452★, 70.453★, and one half credit from: 69.304★, 69.381★, 69.386★;
2. two of the following three blocks:
(a) Geology 67.323★, 67.324★
(b) Geology 67.380
(c) Geology 67.234★, and either 67.333★ or 67.334★;
3. one and a half credits in Geology at the 400 level;
4. Geology 67.498; or Mathematics 70.495★ and one additional half credit in Mathematics or Statistics at the 300 level or above;
5. two Arts or Social Science elective credits.

Mathematics and Physics (Double Honours B.Sc.)

This program requires a minimum of 21.5 credits including 18.5 credits in Mathematics and Physics. Entrance criterion for the program is successful completion of First year with an average grade of B+ or better in Mathematics 69.102, 69.112 (or their equivalents) and Physics 75.100, or permission of both departments.

Course requirements for this program are:

First Year

1. Mathematics 69.102, 69.112 (or their equivalents);
2. Physics 75.100;
3. Chemistry 65.100 or Biology 61.102 (or 61.209★ and 61.230★);
4. one Arts or Social Science elective credit.

Note:

It is highly recommended that Computer Science 95.103★ be taken in the First year in addition to the foregoing courses. When this course is taken for credit, it will be included in the calculation of the overall grade-point average.

Second Year

1. Mathematics 70.200, 70.210, 70.260;
2. Physics 75.211★, 75.222★, 75.235★, 75.342★;
3. one elective half credit in Arts or Social Sciences.

Third Year

1. Mathematics 70.301★, 70.302★, 70.310;
2. Physics 75.307★, 75.338★, 75.361★, 75.362★, 75.381★;
3. one additional half credit in Mathematics or Physics at the 300 level;
4. either Mathematics 70.307★ and Physics 75.388★, or Physics 75.386.

Fourth Year

1. one credit in Mathematics at the 400 level;
2. Physics 75.437★, 75.447★, 75.477★, 75.478★;
3. one additional credit in Mathematics or Physics at the 300 or 400 level;
4. either Mathematics 70.495★ or one of Physics 75.497★, 75.498★;
5. one elective half credit in Arts or Social Sciences.

Operations Research

The Department of Mathematics and Statistics offers a program in Operations Research leading to either a B.A. or a B.Sc. Honours degree. Information and a detailed outline of the requirements for this program are given on pp. 197 and 401.

Graduate Programs: M.Sc. and Ph.D.

For requirements for graduate degrees, see the Calendar for the Faculty of Graduate Studies and Research.

Course Numbering

Course numbers prefixed by 70 indicate courses intended primarily for Honours students; all other courses have numbers prefixed by 69. Credit will not be given for two courses having the same number but different prefixes.

Supplemental Examinations Note

In the following half-credit courses in Mathematics and Statistics, where the course is offered in two successive terms, the Supplemental/Grade-Raising/Deferred Final Examination for the first course will be taken as the second course final examination, except where such a delay might delay graduation in the Fall:

Mathematics 69.006★, 69.007★, 69.017★, 69.107★, 69.109★, 69.117★, 69.119★, 69.207★, 69.208★, 69.217★, 69.257★, 69.259★.

Prerequisites for First-Year Calculus and Algebra Courses

1. Pre-University Calculus:

An OAC in Calculus, or Mathematics 69.007★, (or Grade 13 Calculus), or equivalent.

2. Pre-University Algebra:

An OAC in Algebra and Geometry, or Mathematics 69.017★, (or Grade 13 Algebra), or equivalent.

Note:

An OAC in Finite Mathematics is not an equivalent.

Courses Offered

Note:

Students who have completed Ontario Grade 12 Mathematics, but who have been away from mathematics for several years, or who feel that their mathematics background is weak, should consider taking the course "Refresher Workshop in Mathematics." The Refresher Workshop is offered by the School of Continuing Education as the non-credit course CE 658, and is highly recommended for remedial purposes.

Mathematics 69.006★

Elementary Functions and their Graphs

Review and further study of algebraic, exponential, logarithmic and trigonometric functions; solution of equations; conics; various graphical techniques.

Prerequisite: Grade 12 Mathematics (Advanced/Academic Level), completed prior to September 1988.

See *Supplemental Examinations Note*, on p. 390.

Not offered 1990-91.

Mathematics 69.007★

Introductory Calculus

Limits and continuity. Derivatives (including: logarithmic, exponential and trigonometric functions); curve sketching; applied problems in maxima and minima, and related rates. An introduction to anti-derivatives with applications.

Prerequisite: Grade 12 Mathematics (Advanced/Academic Level) or Mathematics 69.006★ or equivalent. It is strongly recommended that Mathematics 69.017★ or the equivalent be taken before 69.007★.

See *Supplemental Examinations Note*, p. 390.

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week and one hour tutorial.

Mathematics 69.017★

Algebra and Geometry

Linear geometry and equations; proof by induction; complex numbers.

Prerequisite: Grade 12 Mathematics (Advanced/Academic Level) or Mathematics 69.006★ or equivalent.

See *Supplemental Examinations Note*, p. 390.

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week and one hour tutorial.

Mathematics 69.102

Calculus

This course is strongly recommended for students intending to specialize in mathematics, statistics, physics, or related areas. Limits, differentiation, the definite integral, elementary functions, techniques of integration, parametric equations and polar coordinates. Improper integrals, L'Hôpital's rules, sequences and series, Taylor's formulae, introduction to differential equations.

Precludes additional credit for Mathematics 69.104★, 69.107★, 69.207★.

Prerequisites: 1. a pre-university calculus course; and 2. a pre-university algebra course. (See *Prerequisites for First Year Calculus and Algebra Courses*, pp. 390-391.)

Day division: Lectures three hours a week and one hour tutorial.

Note:

Students with less than 75% in their prerequisite Calculus course are advised that the previous experience of the Department indicates that their chance of success in Mathematics 69.102 is minimal, without exceptionally hard work.

Mathematics 69.104★

Calculus for Engineering and Computer Science Students

Functions, derivatives and applications (extremum problems, curve sketching); approximations with derivatives; the mean value theorem. Algebraic functions. The definite and indefinite integral; numerical approximation. Special functions (trigonometric and inverse trigonometric, logarithm and exponential), their derivatives and integrals. Applications: area, volume, average values. Further techniques of integration: integration by parts, partial fractions, and substitutions. An introduction to differential equations. Restricted to students in the Faculty of Engineering or in the School of Computer Science.

Precludes additional credit for Mathematics 69.102 and 69.107★.

Prerequisites: 1. a pre-university calculus course, and 2. a pre-university algebra course. (See *Prerequisites for First Year Calculus and Algebra Courses*, pp. 390-391.)

Day division, Fall term: Lectures three hours a week and one hour tutorial.

Mathematics 69.107★

Elementary Calculus I

Definite and indefinite integrals, differentiation and integration of the elementary functions, techniques and applications of integration.

Precludes additional credit for Mathematics 69.102, 69.104★.

Prerequisites: 1. a pre-university calculus course, and 2. a pre-university algebra course. (See *Prerequisites for First Year Calculus and Algebra Courses*, pp. 390-391.)

See *Supplemental Examinations Note*, p. 390.

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week and one hour tutorial.

Note:

A grade of C- or better in Mathematics 69.107★ is a prerequisite for certain 200-level Mathematics courses.

Mathematics 69.109★

Calculus: with Applications to Business and Economics

Study of functions including trigonometric, logarithmic, exponential, explicit, implicit and inverse; differentiation; integration techniques; functions of several variables; partial differentiation; constrained optimization. Applications in the fields of business and economics.

Precludes additional credit for Mathematics 69.131★ (Architecture 79.101★), Mathematics 69.231★ (Architecture 79.212★), no longer offered.

Prerequisites: 1. a pre-university calculus course; and 2. a pre-university algebra course. (See *Prerequisites for First Year Calculus and Algebra Courses* pp. 390-391.)

See *Supplemental Examinations Note*, p. 390.

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week and one hour tutorial.

Note: Mathematics 69.109★ is not an acceptable prerequisite for entry to 200-level calculus courses.

Mathematics 69.112

Algebra

This course is strongly recommended for students intending to specialize in mathematics, statistics, physics, or related areas. Fields, complex numbers, vector algebra and geometry in 2 and 3 dimensions, matrix algebra, linear

dependence, bases, linear transformations, bilinear and quadratic forms, inner products, eigenvalues, principal axis theorem.

Precludes additional credit for Mathematics 69.114★, 69.117★, 69.119★, 69.217★; and for Mathematics 69.132★ (Architecture 79.201★), no longer offered.

Prerequisites: 1. a pre-university algebra course; and 2. a pre-university calculus course. (See *Prerequisites for First-Year Calculus and Algebra Courses*, pp. 390-391.)

Day division: Lectures three hours a week and one hour tutorial.

Note:

Students with less than 75 percent in their prerequisite Mathematics courses are advised that the previous experience of the Department indicates that their chance of success in Mathematics 69.112 is minimal, without exceptionally hard work.

Mathematics 69.114★

Linear Algebra for Engineering and Computer Science Students

Solution of linear equations. Matrix algebra. Algebra and geometry of complex numbers. Vector algebra and geometry. Restricted to students in the Faculty of Engineering or in the School of Computer Science.

Precludes additional credit for Mathematics 69.112, 69.117★, 69.119★.

Prerequisites: 1. a pre-university algebra course; and 2. a pre-university calculus course. (See *Prerequisites for First-Year Calculus and Algebra Courses*, pp. 390-391.)

Day division, Winter term: Lectures three hours a week and one hour tutorial.

Mathematics 69.117★

Linear Algebra I

Systems of linear equations; vector space of n -tuples, subspaces and bases; matrix transformations, kernel, range; matrix algebra and determinants. Inner products and orthogonality. Eigenvalues, diagonalization and applications. Emphasis throughout this course will be on the computational aspects (and not on theoretical aspects).

Precludes additional credit for Mathematics 69.112, 69.114★, 69.119★.

Prerequisites: 1. a pre-university algebra course; and 2. a pre-university calculus course. (See *Prerequisites for First-Year Calculus and Algebra Courses*, pp. 390-391.) See *Supplemental Examinations Note*, p. 390.

Day and Evening divisions, Fall and Winter terms: Lectures three hours a week and one hour tutorial.

Note:

A grade of C- or better in Mathematics 69.117★ is a prerequisite for certain 200-level Mathematics courses.

Mathematics 69.119★

Algebra: With Applications to Business and Economics

Algebraic concepts, systems of linear equations, vector algebra; matrix algebra, rank, inversion, determinants; linear programming — geometric approach, simplex method, etc. Applications in the fields of business and economics.

Precludes additional credit for Mathematics 69.112, 69.114★, 69.117★; and for Mathematics 69.132★ (Architecture 79.201★), no longer offered.

Prerequisites: 1. a pre-university algebra course; and 2. a pre-university calculus course. (See *Prerequisites for First-Year Calculus and Algebra Courses*, pp. 390-391.) See *Supplemental Examinations Note*, p. 390.

Day division, Fall term; Day and Evening divisions, Winter term: Lectures three hours a week and one hour tutorial.

Mathematics 69.141★

Gambling I

History of gambling. Blackjack, craps, poker, horse-racing, roulette, backgammon, bookmaking and stock market. Detection of methods of cheating. Intended primarily for students not majoring in Mathematics.

Not offered 1990-91.

Mathematics 69.142★

Gambling II

A deeper mathematical investigation into some of the topics covered in Mathematics 69.141★, plus the topics of game theory and gamblers' ruin formulas. Statistical methods for detecting cheating. Some discussion also of the psychology and sociology of gambling. Intended primarily for students not majoring in Mathematics.

Prerequisites: Grade 13 Mathematics (or equivalent) and Mathematics 69.141★.

Not offered 1990-91.

Mathematics 69.185★

Introduction to Discrete Structures

An introduction to the discrete mathematics and discrete structures of computer science, providing an overview of the major strands in theoretical computer science. The following topics are introduced: propositional and predicate calculus, combinatorial counting and recurrence relations, graphs, and formal language theory, automata theory, computability. (Also listed as Computer Science 95.185★.) This course is available to Science students only as a free option.

Prerequisites: Two OACs in Mathematics, and one of Computer Science 95.105★ or 95.103★ (which may be taken concurrently).

Day division, Fall and Winter terms: Lectures three hours a week.

Mathematics 69.201

Intermediate Calculus

Differential calculus of functions of several variables, multiple integration, elements of infinite series, complex numbers, differential equations. Restricted to students in Engineering or Physics.

Precludes additional credit for Mathematics 69.202, 69.207★, 69.208★, 69.244★, 70.200, 70.260.

Prerequisites: Mathematics 69.104★ and 69.114★ (or Mathematics 69.107★ with a grade of C- or better, and credit in Mathematics 69.117★).

Day division: Lectures three hours a week and one hour tutorial.

Mathematics 69.202

Intermediate Mathematics

Partial differentiation, infinite series, multiple integration, differential equations, Fourier series, introduction to matrix and eigenvalue problems. Intended for Science students. Precludes additional credit for Mathematics 69.201, 69.207★, 69.208★, 69.244★, 70.200, 70.260.

Prerequisites: Mathematics 69.107★ and 69.117★ with an average grade of C- or better.

Day division: Lectures three hours a week and one hour tutorial.

Mathematics 69.207★

Elementary Calculus II

Further techniques of integration, improper integrals, polar coordinates, parametric equations, indeterminate forms, sequences and series, Taylor's formula and series, first

order and linear differential equations.

Precludes additional credit for Mathematics 69.102, 69.201, 69.202.

Prerequisite: Mathematics 69.104★, or a grade of C- or better in Mathematics 69.107★.

See *Supplemental Examinations Note*, p. 390.

Day division, Fall term and Evening division, Winter term:

Lectures three hours a week and one hour tutorial.

Mathematics 69.208★

Intermediate Calculus

Partial differentiation, chain rule, gradient, line and multiple integrals with applications, transformations, implicit and inverse function theorems.

Precludes additional credit for Mathematics 69.201, 69.202, 70.200.

Prerequisites: Mathematics 69.102 or 69.207★, and 69.112 or 69.117★.

See *Supplemental Examinations Note*, p. 390.

Day division, Fall term and Evening division, Winter term:

Lectures three hours a week and one hour tutorial.

Mathematics 69.217★

Linear Algebra II

Finite-dimensional vector spaces (over \mathbb{R} and \mathbb{C}), subspaces, linear independence and bases. Linear transformations and matrices. Inner product spaces (over \mathbb{R} and \mathbb{C}); Orthonormal bases. Eigenvalues and diagonalization. Bilinear and quadratic forms; principal axis theorem.

Precludes additional credit for Mathematics 69.112.

Prerequisite: Mathematics 69.114★, or a grade of C- or better in Mathematics 69.117★; or a grade of C- or better in Mathematics 69.119★, with directed reading.

See *Supplemental Examinations Note*, p. 390.

Day division, Fall term and Evening division, Winter term:

Lectures three hours a week and one hour tutorial.

Mathematics 69.218★

Introductory Abstract Algebra

Sets and relations, number theory, group theory, ring theory, cardinal numbers.

Precludes additional credit for Mathematics 69.311★ and 70.210.

Prerequisite: Mathematics 69.112 or 69.217★.

Day division, Fall term and Evening division, Winter term:

Lectures three hours a week and one hour tutorial.

Mathematics 69.244★

Ordinary Differential Equations I

Ordinary differential equations and their applications. Techniques of solving special types of first-order equations. Special solvable equations of second order. Linear equations of order n . Homogeneous and non-homogeneous linear equations with constant coefficients; variation of parameters; simple harmonic motion. Linear ordinary differential equations with variable coefficients of special types (e.g. Cauchy, Legendre). Series solutions of ordinary differential equations of second order about ordinary points. Precludes additional credit for Mathematics 69.201, 69.202, 70.260 and for Mathematics 69.245★ (no longer offered).

Prerequisites: Mathematics 69.102 and 69.112 (or 69.117★ and 69.207★).

Day division, Winter term: Lectures three hours a week and one hour tutorial.

Mathematics 69.250

Introduction to Statistical Analysis

Frequency distributions; moments; measures of central tendency, dispersion, skewness; probability; distributions (binomial, Poisson, normal, z , t , F , χ^2); statistical inference,

confidence intervals; experimental designs (randomized block, Latin square); enumeration statistics; least squares analysis, introduction to correlation and regression analysis; non-parametric tests. Intended for non-Mathematics students.

Precludes additional credit for Mathematics 69.257★, 69.259★, 69.266★, 69.267★, 69.352★, Economics 43.220, Geography 45.201★, Psychology 49.200.

Prerequisite: Mathematics 69.007★.

Not offered 1990-91.

Mathematics 69.257★

Introduction to Statistics

Data analysis; introduction to probability theory; some standard discrete and continuous distributions such as the binomial, Poisson, hypergeometric, normal, t , and chi-square; their application to interval estimation and significance testing; simple linear regression and correlation, contingency tables; testing for goodness-of-fit. Computational aspects of statistics. Not acceptable for Engineering students.

Precludes additional credit for Mathematics 69.250, 69.266★, 69.352★, Economics 43.220, Geography 45.201★.

Prerequisites: Mathematics 69.107★ and 69.117★ or their equivalent (may be taken concurrently) or permission of the Department.

See *Supplemental Examinations Note*, p. 390.

Day and Evening divisions, Fall term and Day division, Winter term: Lectures three hours a week and one hour laboratory.

Mathematics 69.259★

Computational Statistics

Exploratory data analysis, non-parametric methods, linear regression and correlation, basic experimental designs, related topics. Computer packages are used for statistical analyses.

Precludes additional credit for Mathematics 69.250, 69.267★, Economics 43.220.

Prerequisite: Mathematics 69.257★ or equivalent or permission of the Department.

See *Supplemental Examinations Note*, p. 390.

Day division, Winter term: Lectures three hours a week and one hour laboratory.

Mathematics 69.265★

Probability Models

Introductory probability theory including conditional probability, independence, discrete and continuous random variables, Shannon information and coding. Introduction to stochastic modelling, Markov chains and queueing theory. Random number generators and Monte Carlo computer simulation. Statistical methods of fitting and evaluating models; estimation and goodness-of-fit tests. The basic ideas and methods are illustrated with applications to computer system performance evaluation, analysis of algorithms, reliability, search and decision problems. Restricted to students in the Bachelor of Computer Science program. Precludes additional credit for Mathematics 69.352★ and 70.260.

Prerequisites: Mathematics 69.207★ (or 69.102) and 69.114★ (or 69.117★).

Day division, Winter term: Lectures three hours a week and one hour tutorial.

Mathematics 69.266★

Business Statistics I

Descriptive statistics; probability concepts; discrete and continuous random variables; normal, t , chi-square and F distributions; interval estimation; testing hypotheses;

enumeration statistics; introduction to statistical packages. Emphasis is placed on developing an ability to interpret the results of statistical analyses with applications drawn from the business world. Restricted to students in the School of Business.

Precludes additional credit for Mathematics 69.250, 69.257★, 69.352★, Economics 43.220, Geography 45.201★.

Prerequisites: Mathematics 69.109★ and 69.119★ (or their equivalents) with an average grade of C- or better.

Day division, Fall term: Lectures three hours a week and one hour laboratory.

Mathematics 69.267★

Business Statistics II

Topics in simple and multiple linear regression analysis; simple, multiple and partial correlation; one- and two-way analyses of variance; covariance analysis; simple random, stratified, cluster, systematic, two-stage sampling from a finite population; non-parametric tests. SPSS (or an equivalent computer package) is used to illustrate the computational and interpretational aspects of the course. Restricted to students in the School of Business.

Precludes additional credit for Mathematics 69.250, 69.259★, Economics 43.220.

Prerequisite: Mathematics 69.266★.

Day division, Winter term: Lectures three hours a week and one hour laboratory.

Mathematics 69.304★

Boundary Value Problems

Laplace transforms. Differential equations; solution in series; the formulation of boundary value problems in mechanics, heat conduction, etc.; the method of separation of variables; eigenfunctions and eigenvalues; Fourier series; Bessel and Legendre functions and applications. This course may be taken for credit as a 300-level Honours Mathematics course, by students in any Honours program in the Department of Mathematics and Statistics.

Precludes additional credit for Mathematics 69.375★, 70.308★, Physics 75.386, 75.388★, and for Mathematics 69.306★ (no longer offered).

Prerequisites: Mathematics 69.201; or 69.202; or 69.208★ and 69.244★, or permission of the Department.

Day division, Fall term: Lectures three hours a week and one hour tutorial.

Mathematics 69.307★

Functions of a Complex Variable

Analytic functions, contour integration, residue calculus, conformal mapping. Intended for non-engineering students.

Precludes additional credit for Mathematics 69.376★, 70.307★, Physics 75.386, and for Mathematics 69.305★ (no longer offered).

Prerequisite: Mathematics 69.201, 69.202 or 69.208★.

Day division, Winter term: Lectures three hours a week and one hour tutorial.

Mathematics 69.309★

Topics in Analysis

The real number system, sequences and series, functions of a single real variable, derivatives, the definite integral, uniform convergence.

Precludes additional credit for Mathematics 70.200.

Prerequisite: Mathematics 69.201, 69.202 or 69.208★.

Day division, Winter term: Lectures three hours a week and one hour tutorial.

Mathematics 69.310

Applied Algebra

Similarity of matrices, Jordan form, spectral decomposition, Markov chains, systems of differential and difference equations, quadratic forms, symmetric operators. Rayleigh-Ritz principle. Generalized inverse and applications to statistics; least-squares with applications to Fourier series; factorizations over classical number systems; finite field extensions with applications including Latin squares, error correcting codes; Boolean rings with applications to logic and switching circuits.

Precludes additional credit for Mathematics 70.210 or 70.310.

Prerequisites: Mathematics 69.217★ and 69.218★ or permission of the department.

Not offered 1990-91.

Mathematics 69.311★

Algebraic Structures with Computer Applications

Introduction to algebraic structures: groups, rings, fields, lattices, and Boolean algebras; with applications of interest to students in Computer Science. This course is intended primarily for students in the Computer Science programs.

This course may not be used to meet the 300-level course requirements in any Major or Honours program in Mathematics and Statistics.

Precludes additional credit for Mathematics 69.218★ or 70.210.

Prerequisites: Mathematics 69.217★ and one of Computer Science 95.201★ (no longer offered), 95.202★ or 95.207★ or permission of the Department.

Day division, Fall term: Lectures three hours a week and one hour tutorial.

Mathematics 69.325★

Euclidean Geometry and its Groups

Transformations of the Euclidean plane (isometries, similarities); solutions of geometric problems using these transformations; groups of symmetries of finite plane figures, frieze patterns, and regular polyhedra; inversion and the extension to the inversive plane; problems solved using inversion; orthogonal circles and pencils of coaxial circles.

Prerequisite: Mathematics 69.218★.

Not offered 1990-91.

Mathematics 69.326★

Plane Projective Geometry

Axioms of Desarguesian geometry, principle of duality; projectivities, perspectivities, and the fundamental theorem; collineations (homologies and elations); correlations (polarities and conics); algebraic model; introduction to finite projective planes.

Precludes additional credit for Mathematics 70.326★.

Prerequisite: Mathematics 69.218★.

Day division, Winter term: Lectures three hours a week and one hour tutorial.

Mathematics 69.344★

Ordinary Differential Equations II

Series solutions of ordinary differential equations of second order about regular singular points; asymptotic solutions. Systems of ordinary differential equations of first order; matrix methods. Existence and uniqueness theorems. Non-linear autonomous systems of order 2; qualitative theory. Numerical solutions of ordinary differential equations.

Precludes additional credit for Mathematics 70.308★.

Prerequisites: Mathematics 69.244★, 69.208★ and 69.217★.

Day division, Fall term: Lectures three hours a week and one hour tutorial.

Mathematics 69.350**Statistical Theory**

Discrete and continuous distributions: moment-generating functions, marginal and conditional distributions, transformation theory, limiting distributions; point and interval estimation, hypothesis testing, chi-square tests with enumeration data; linear models.

Precludes additional credit for Mathematics 70.350.

Prerequisites: Mathematics 69.208★ (or 69.201 or 69.202) and one of 69.250, 69.257★, 69.259★, 69.267★, Economics 43.220 or permission of the Department.

Evening division: Lectures three hours a week and one hour tutorial.

Mathematics 69.352★**Probability and Statistics**

Axioms of probability; conditional probability and independence; joint, marginal and conditional distributions; mathematical expectation, discrete and continuous distributions: binomial, negative binomial, hypergeometric, Poisson, gamma, normal; moment-generating functions, central limit theorem; sampling distributions; estimation: method of moments, maximum likelihood, minimum variance; confidence intervals; hypothesis testing for one and two populations. Engineering applications: acceptance sampling, quality control charts, life testing and statistical reliability. Restricted to students in the Faculty of Engineering.

This course may not be used to meet the 300-level course requirements in any Major or Honours program in Mathematics and Statistics.

Precludes additional credit for Mathematics 69.250, 69.257★, 69.265★, 69.266★, Economics 43.220, and Mathematics 69.258★ (no longer offered).

Prerequisite: Mathematics 69.201.

Day division, Winter term: Lectures three hours a week and one hour laboratory.

Mathematics 69.353★**Regression Analysis**

Review of simple and multiple regression with matrices, Gauss-Markov theorem, polynomial regression, indicator variables, residual analysis, weighted least squares, variable selection techniques, nonlinear regression, correlation analysis and autocorrelation. Computer packages are used for statistical analyses.

Precludes additional credit for Mathematics 70.355★, Economics 43.476★, and for Mathematics 69.351 (no longer offered); Psychology 49.300 is precluded for additional credit for students registered in a Mathematics program.

Prerequisite: Mathematics 69.259★ or Mathematics 69.267★, or Economics 43.220, or permission of the Department.

Day division, Fall term: Lectures three hours a week and one hour laboratory.

Mathematics 69.354★**Analysis of Variance and Experimental Design**

Single and multifactor analysis of variance, orthogonal contrasts and multiple comparisons, analysis of covariance; nested, crossed and repeated measures designs; completely randomized, randomized block, Latin squares, factorial experiments, related topics. Computer packages are used for statistical analyses.

Precludes additional credit for Mathematics 70.355★, and for Mathematics 69.351 (no longer offered); Psychology 49.300 is precluded for additional credit for students registered in a Mathematics program.

Prerequisite: Mathematics 69.353★ or permission of the Department.

Day division, Winter term: Lectures three hours a week and one hour laboratory.

Mathematics 69.357★**Sampling Methodology**

An introduction to the sample survey as a vehicle for information collection by government, business, scientific and social agencies. Topics include: planning a survey, questionnaire design, simple random, stratified, systematic and cluster sampling designs, estimation methods, problem of non-response; related topics. Illustrations from a variety of fields.

Precludes additional credit for Interdisciplinary Social Sciences 03.401★ and 03.402★, for Science students.

Prerequisite: Mathematics 69.257★ or 69.266★ or Economics 43.220 or permission of the Department.

Evening division, Winter term: Lectures three hours a week and one hour laboratory.

Mathematics 69.375★**Mathematical Methods I**

Laplace transforms, Fourier series and Fourier transforms, solutions of partial differential equations of mathematical physics, boundary value problems, applications. Restricted to students in Engineering or Physics.

Precludes additional credit for Mathematics 69.304★, Physics 75.386, 75.388★, and for Mathematics 69.305★, 69.306★ (no longer offered).

Prerequisite: Mathematics 69.201.

Day division, Fall term: Lectures three hours a week and one hour tutorial.

Mathematics 69.376★**Mathematical Methods II**

Analytic functions, contour integration, residues, applications. Matrix theory, eigenvalues, diagonalization of symmetric matrices, applications. Restricted to students in Engineering or Physics.

Precludes additional credit for Mathematics 69.307★, 70.307★, Physics 75.386, and for Mathematics 69.305★ (no longer offered).

Prerequisite: Mathematics 69.201.

Not offered 1990-91.

Mathematics 69.381★**Linear Programming**

Formulation of linear programming problems, the simplex method, duality theory, implementations, extensions and applications. Network flow problems and the network simplex method.

Precludes additional credit for Economics 43.404★, Engineering 94.320★.

Prerequisites: Mathematics 69.217★, and 69.208★ (or 69.201).

Day division, Winter term: Lectures three hours a week and one hour tutorial.

Mathematics 69.384★**Data Structures and Algorithm Analysis**

Review of basic data structures such as stacks, queues and lists. Algorithms for their implementation. Representation of arrays, sets and relations. Trees and graphs — representation and applications. Basic techniques of design and analysis of efficient algorithms for sorting and searching. Hashing, dynamic storage allocation, garbage collection. (Also listed as Computer Science 95.384★.)

Prerequisites: A 200-level Mathematics course and Computer Science 95.202★.

Day division, Fall and Winter terms: Lectures three hours a week.

Mathematics 69.386★

Numerical Analysis

Elementary discussion of error, polynomial interpolation, quadrature, linear systems of equations and matrix inversion, non-linear equations, difference equations and ordinary differential equations. (Also listed as Computer Science 95.386★.)

Prerequisites: Computer Science 95.103★ or 95.106★, Mathematics 69.102 or 69.207★ (or 69.201 or 69.202) and 69.112 or 69.217★.

Evening division, Fall term: Lectures three hours a week and one hour tutorial.

Mathematics 69.387★

Mathematical Software

Incorporation of basic numerical methods into efficient, reliable software. The course includes examination of existing software systems, e.g., linear systems, non-linear systems, optimization, or differential equations. (Also listed as Computer Science 95.387★.)

Prerequisite: Mathematics 69.386★.

Not offered 1990-91.

Mathematics 69.389★

Computational Number Theory

This course treats a number of topics from elementary number theory in a computational and algorithmic way. The topics are chosen from: primality testing, factorization of integers and polynomials, solution of diophantine equations, approximation of irrationals by rationals.

Prerequisites: Mathematics 69.218★ or 69.311★ or 70.210; knowledge of a computer language is also required.

Not offered 1990-91.

Mathematics 69.397★

Directed Studies

Available only to students whose program requires a half credit not offered by the Department of Mathematics and Statistics.

Mathematics Courses for Honours Students

Mathematics 70.200

Calculus and Introductory Analysis

Higher dimensional calculus, chain rule, gradient, line and multiple integrals with applications. Use of implicit and inverse function theorems. Real number axioms, limits, continuous functions, differentiability, infinite series, uniform convergence, the Riemann integral.

Precludes additional credit for Mathematics 69.201, 69.202, 69.208★, 69.309★.

Prerequisite: Mathematics 69.102 or 69.207★.

Day division: Lectures three hours a week and one hour tutorial.

Mathematics 70.210

Algebra

Set theory, algebraic systems, vector spaces, inner product spaces, linear transformations, determinants, quadratic forms, selected applications.

Precludes additional credit for Mathematics 69.218★ or 69.311★.

Prerequisite: Mathematics 69.112 or 69.217★.

Day division: Lectures three hours a week and one hour tutorial.

Mathematics 70.260

Introduction to the Applications of Mathematics

Ordinary differential equations of order one and two. Systems of linear differential equations. Existence and uniqueness.

Difference equations. Modelling with differential and difference equations. Numerical solutions. Random variables, distribution functions, joint and conditional distributions, generating functions. Stochastic models, Markov chains. Simulation. Applications to areas such as reliability, queueing, econometrics, statistical mechanics and operations research.

Precludes additional credit for Mathematics 69.201, 69.202, 69.244★, 69.265★, and for 69.245★ (no longer offered).

Prerequisites: Mathematics 69.102 (or 69.207★) and 69.112 (or 69.217★); knowledge of a computer language is also required.

Day division: Lectures three hours a week and one hour tutorial.

Mathematics 70.297★

Directed Studies

Available only to Honours students whose program requires a half credit not offered by the Department of Mathematics and Statistics.

Boundary Value Problems

Note:

Mathematics 69.304★, Boundary Value Problems, may be taken for credit as a 300-level Honours Mathematics course, by students in any Honours program in the Department of Mathematics and Statistics (see p. 394).

Mathematics 70.301★

Real Analysis

Metric spaces; limits, continuity, open and closed sets, compactness, connectedness and completeness. Uniform convergence of sequences of functions, as convergence in metric spaces of bounded and continuous functions. Weierstrass approximation theorem. Contraction mappings and applications to integral and differential equations.

Prerequisite: Mathematics 70.200 or permission of the Department.

Day division, Fall term: Lectures three hours a week and one hour tutorial.

Mathematics 70.302★

Advanced Calculus

Vector fields on surfaces. The functions div, curl and grad. Line and surface integrals. The divergence theorem and Stokes' theorem. Exterior algebra. Stokes' formula. Functions of bounded variation. The Riemann-Stieltjes integral.

Prerequisite: Mathematics 70.200 or permission of the Department.

Day division, Winter term: Lectures three hours a week and one hour tutorial.

Mathematics 70.307★

Functions of a Complex Variable

Analytic functions, contour integration, residue calculus, conformal mapping.

Precludes additional credit for Mathematics 69.307★, 69.376★, Physics 75.386, and for Mathematics 69.305★ (no longer offered).

Prerequisite: Mathematics 70.200 or permission of the Department.

Day division, Fall term: Lectures three hours a week and one hour tutorial.

Mathematics 70.308★

Ordinary Differential Equations

Analytic ordinary differential equations: series solutions of ordinary differential equations about ordinary and regular singular points. Asymptotic solutions. Sturm-Liouville theory. Bessel and Legendre functions. Fourier series.

Precludes additional credit for Mathematics 69.304★, 69.344★, and Physics 75.386, 75.388★.

Prerequisites: Mathematics 70.200 and 70.260.
Not offered 1990-91.

Mathematics 70.310

Modern Algebra

Graphs, groups, rings, integral domains, fields; polynomial domains and linear algebra with applications to enumeration problems, optimization of combinatorial problems, coding theory.

Precludes additional credit for Mathematics 69.310.

Prerequisite: Mathematics 70.210 or permission of the Department.

Day division: Lectures three hours a week and one hour tutorial.

Mathematics 70.326★

Foundations of Projective Geometry

Definition of a general projective plane and immediate consequences; finite planes (combinatorial results, subplanes, incidence matrices) and planar ternary rings; collineations, role of Desargues' configuration, examples of types of planes.

Prerequisite: Mathematics 70.210.

Precludes additional credit for Mathematics 69.326★.

Day division, Winter term: Lectures three hours a week and one hour tutorial.

Mathematics 70.336★

Elements of Set Theory

Informal treatment of the axioms of set theory. Development of the systems of natural numbers, integers, rational numbers and real numbers, using both Dedekind sections and Cauchy sequences based on Peano's axioms. The axiom of choice, Zorn's lemma, well-ordering. The Schröder-Bernstein theorem, cardinal numbers, ordinal numbers, transfinite induction, cardinal and ordinal arithmetics.

Prerequisite: Mathematics 70.210 or permission of the Department.

Not offered 1990-91.

Mathematics 70.345★

Classical Mechanics

Axiomatic approach to Newtonian mechanics. Simple harmonic motion. One- and two-dimensional projectiles. Central forces; planetary orbits. Systems of particles; collision problems. Moments and products of inertia; two-dimensional rigid body motions. Generalized coordinates; Lagrange's equation. Moving axes; motion near the surface of the earth.

Precludes additional credit for Mathematics 69.345★ (no longer offered).

Prerequisites: Mathematics 70.200 (or 69.208★) and 70.260 (or 69.244★).

Not offered 1990-91.

Mathematics 70.346★

Autonomous Dynamical Systems

Basic concepts of dynamical systems. Stability; limit cycles; Lyapunov's direct method. Theory of autonomous dynamical systems. Volterra systems; principle of competitive exclusion in population biology. The threshold theorem of epidemiology. Basic concepts of nonequilibrium statistical mechanics.

Prerequisites: Mathematics 70.200 and 70.260.

Not offered 1990-91.

Mathematics 70.350

Mathematical Statistics

Random variables and moment-generating functions; concepts of conditioning and correlation; laws of large numbers, central limit theorem; multivariate normal distribution; distributions of functions of random variables, sampling distributions, order statistics, empirical distribution functions, Monte Carlo methods, elements of decision theory, point estimation, interval estimation, tests of hypotheses; robustness, nonparametric methods.

Precludes additional credit for Mathematics 69.350.

Prerequisites: Mathematics 70.260 (or 69.265★) and Mathematics 70.200 (or 69.208★), or permission of the Department.

Day division: Lectures three hours a week and one hour tutorial.

Mathematics 70.355★

Regression and Experimental Design

Linear regression – theory and methods; design of experiments – analysis of the completely randomized, randomized block and Latin square designs; multiple comparisons; factorial experiments; related topics.

Precludes additional credit for Mathematics 69.353★, 69.354★, Economics 43.476★, and for 69.351 (no longer offered). Psychology 49.300 is precluded for additional credit for students registered in a Mathematics program.

Prerequisites: Mathematics 69.217★, 69.259★; 69.350 or 70.350 (which may be taken concurrently), or permission of the Department.

Day division, Winter term: Lectures three hours a week and one hour laboratory.

Mathematics 70.356★

Stochastic Processes and Queueing Theory

Stochastic modelling, Markov chains, birth and death processes, renewal theory. Queueing theory: analytical and simulation methods. Applications to computer systems, operations research and social sciences.

Prerequisites: Mathematics 69.208★, 69.217★ and 69.265★; or Mathematics 70.260; or permission of the Department.

Day division, Fall term: Lectures three hours a week and one hour tutorial.

Mathematics 70.385★

Discrete Structures and Applications

Enumeration: elementary methods, inclusion and exclusion, recurrence relations, generating functions and applications. Graph theory and algorithms: connectivity, planarity, Hamilton and Euler paths. Error-correcting codes. (Also listed as Computer Science 95.385★.)

Prerequisite: One of Mathematics 69.218★, 69.311★, or 70.210.

Day division, Fall and Winter terms: Lectures three hours a week and one hour tutorial.

Mathematics 70.390★

Mathematical Problem Solving

An introduction to the techniques of mathematical problem solving, including: pattern recognition, symmetry exploitation, case by case analysis, context recognition, arguments by contradiction, counting arguments, extreme case analysis, equivalent problem formulation, solution by generalization. Problems treated are of a high level of difficulty and require a breadth of mathematical knowledge as well as considerable technical skills. Problems are chosen from many areas of mathematics including: analysis, number theory, geometry, algebra, probability, combinatorics, graph theory.

This course is normally restricted to Honours students in

Mathematics and Statistics.

Prerequisites: At least two courses from: Mathematics 70.200, 70.210, 70.260, or permission of the Department.
Not offered 1990-91

- *A selection of courses in the 400 series will be offered.*

**Mathematics 70.401★
Vector Calculus**

Linear transformations, multiple integrals, differential forms, vector functions and fields, vector calculus, applications.

Prerequisite: Mathematics 70.302★ or permission of the Department.
Not offered 1990-91.

**Mathematics 70.403★
Functional Analysis**

Banach spaces and bounded linear operators, Hahn-Banach extension and separation, dual spaces, bounded inverse theorems, uniform boundedness principle, applications. Compact operators. Differential calculus in Banach spaces, inverse and implicit function theorems and their application to differential equations.

Prerequisite: Mathematics 70.301★ or permission of the Department.
Not offered 1990-91; see Mathematics 70.508 in the Calendar of the Faculty of Graduate Studies and Research.

**Mathematics 70.407★
Measure and Integration Theory**

Lebesgue measure and integration on the real line; sigma algebras and measures; integration theory; L_p spaces; Fubini's theorem; decomposition theorems and Radon-Nikodym derivatives.

Prerequisite: Mathematics 70.301★ or 70.302★ or permission of the Department.
Day division, Fall term: Lectures three hours a week.

**Mathematics 70.415★
Rings and Modules**

Fundamental concepts in rings and modules, structure theorems, applications.

Prerequisite: Mathematics 70.310 or permission of the Department.
Not offered 1990-91.

**Mathematics 70.416★
Group Theory**

Fundamental principles as applied to abelian, nilpotent, solvable, free and finite groups; representations.

Prerequisite: Mathematics 70.310 or permission of the Department.
Day division, Fall term: Lectures three hours a week.

**Mathematics 70.417★
Commutative Algebra**

Fields, including algebraic and transcendental extensions, Galois theory, valuation theory; Noetherian commutative rings, including Noether decomposition theorem and localization.

Prerequisite: Mathematics 70.310 or permission of the Department.
Not offered 1990-91.

**Mathematics 70.418★
Homological Algebra and Category Theory**

Axioms of set theory; categories, functors, natural transformations; free, projective, injective and flat modules; tensor products and homology functors, derived functors; dimension theory.

Prerequisite: Mathematics 70.310 or permission of the Department.

Day division, Winter term: Lectures three hours a week.

Mathematics 70.425★

Introduction to General Topology

Topological spaces, maps, subspaces, product and identification topologies, separation axioms, compactness, connectedness.

Prerequisite: Mathematics 70.301★ or permission of the Department.
Day division, Fall term: Lectures three hours a week.

Mathematics 70.426★

Introduction to Algebraic Topology

An introduction to homotopy theory. Topics include the fundamental group, covering spaces and the classification of two-dimensional manifolds.

Prerequisites: Mathematics 70.310 and 70.425★ or permission of the Department.

Not offered 1990-91; see Mathematics 70.256 in the Calendar of the Faculty of Graduate Studies and Research.

Mathematics 70.427★

Foundations of Geometry

A study of at least one modern axiom system of Euclidean and non-Euclidean geometry, embedding of hyperbolic and Euclidean geometries in the projective plane, groups of motions, models of non-Euclidean geometry.

Prerequisite: Mathematics 70.310 (may be taken concurrently) or permission of the Department.
Not offered 1990-91.

Mathematics 70.428★

Introduction to Differentiable Manifolds

A study of differentiable manifolds from the point of view of either differential topology or differential geometry. Topics such as smooth mappings, transversality, intersection theory, vector fields on manifolds, Gaussian curvature, Riemannian manifolds, differential forms, tensors and connections are included.

Prerequisite: Mathematics 70.301★ or permission of the Department.
Day division, Winter term: Lectures three hours a week.

Mathematics 70.435★

Analytic Number Theory

Dirichlet series, characters, Zeta-functions, prime number theorem, Dirichlet's theorem on primes in arithmetic progressions, binary quadratic forms.

Prerequisite: Mathematics 70.307★ or permission of the Department.
Not offered 1990-91.

Mathematics 70.436★

Algebraic Number Theory

Algebraic number fields, bases, algebraic integers, integral bases, arithmetic in algebraic number fields, ideal theory, class number.

Prerequisite: Mathematics 70.310 (may be taken concurrently) or permission of the Department.
Day division, Fall term: Lectures three hours a week.

Mathematics 70.445★

Analytical Dynamics

Dynamics of a rigid body in three dimensions. Euler angles. Inertia tensor, Euler's equations of motion. Hamilton's equations. Canonical transformation. Hamilton-Jacobi theory. Theory of small oscillations.

Prerequisite: Mathematics 70.345★ or permission of the

Department.

Not offered 1990-91.

Mathematics 70.446★

Hydrodynamics and Elasticity

Properties of Cartesian tensors; fundamental laws; motion of fluids (perfect and viscous); elastic materials.

Prerequisites: Mathematics 70.307★, 70.345★ and 70.346★ or permission of the Department.

Not offered 1990-91.

Mathematics 70.447★

Tensor Analysis and Relativity Theory

Development of tensor analysis, application to Riemannian spaces and relativity theory.

Prerequisites: Mathematics 70.345★ and 70.346★ or permission of the Department.

Not offered 1990-91.

Mathematics 70.450★

Parametric Estimation

Preliminaries on probability theory; exact and asymptotic sampling distributions; unbiasedness, consistency, efficiency, sufficiency and completeness; properties of maximum likelihood estimators; least squares estimation of location and scale parameters based on order statistics and sample quantiles; Best Asymptotically Normal (BAN) estimators.

Prerequisite: Mathematics 70.350 or permission of the Department.

Day division, Fall term: Lectures three hours a week.

Mathematics 70.451★

Probability Theory

Introduction to probability, characteristic functions, probability distributions, limit theorems.

Prerequisite: Mathematics 70.350 or permission of the Department.

Not offered 1990-91.

Mathematics 70.452★

Survey Sampling

Basic concepts in sampling from finite populations; simple random sampling; stratified sampling; choice of sampling unit; cluster and systematic sampling; introduction to multistage sampling; ratio estimation; sampling with unequal probabilities and with replacement; replicated sampling; related topics.

Prerequisites: Mathematics 69.259★ and either 70.350 or 69.350, or permission of the Department.

Day division, Fall term: Lectures three hours a week.

Mathematics 70.453★

Applied Multivariate Analysis

Selected topics in regression and correlation non-linear models. Multivariate statistical methods, principal components, factor analysis, multivariate analysis of variance, discriminant analysis, canonical correlation, analysis of categorical data.

Prerequisites: Mathematics 70.355★, or 69.350 and 69.354★, or permission of the Department.

Day division, Fall term: Lectures three hours a week.

Mathematics 70.456★

Non-Parametric Methods

Order statistics; rank statistics; permutations; uniform distribution over the space of permutations; distribution of linear rank statistics; approximate normality of linear rank statistics; hypothesis of randomness; stochastic ordering; Wilcoxon test, median tests, Van Der Waerden test, Kolmogorov-Smirnov test; hypothesis of symmetry and ran-

dom blocks; hypothesis of independence; treatment of ties; power and efficiency of rank tests.

Prerequisite: Mathematics 70.350 or permission of the Department.

Not offered 1990-91.

Mathematics 70.457★

Statistical Inference

Sufficient statistics, simple and composite hypotheses, most powerful and similar region test, distribution-free tests, confidence intervals, goodness-of-fit and likelihood ratio tests, large sample theory, Bayesian and likelihood methods, sequential tests.

Prerequisite: Mathematics 70.450★ or permission of the Department.

Day division, Winter term: Lectures three hours a week.

Mathematics 70.458★

Stochastic Models

Markov systems, stochastic networks, queueing networks, spatial processes, approximation methods in stochastic processes and queueing theory. Applications to the modelling and analysis of computer-communications systems and other distributed networks.

Prerequisite: Mathematics 70.356★ or permission of the Department.

Day division, Winter term: Lectures three hours a week.

Mathematics 70.459★

Topics in Stochastic Optimization and Advanced Mathematical Modelling

Topics chosen from: stochastic dynamic programming, Markov decision processes, search theory, sequential inference problems, optimal stopping, analysis and solution of deterministic and stochastic modelling problems in the physical, social and life sciences. Students will present a paper on applications of particular interest to them.

Prerequisites: Mathematics 70.260 (or 69.244★ and 69.265★); 69.257★; 70.356★, or permission of the Department.

Day division, Winter term: Lectures three hours a week.

Mathematics 70.470★

Partial Differential Equations

First order linear, quasi-linear, and non-linear equations; second order equations in two and more variables; systems of equations; the wave equation; Laplace and Poisson equations, Dirichlet and Neumann problems; Green's functions.

Prerequisites: Mathematics 70.308★ and one of 70.302★ or 70.307★ or permission of the Department.

Not offered 1990-91.

Mathematics 70.471★

Topics in Partial Differential Equations

Theory of distributions, initial-value problems based on 2-dimensions wave equations, Laplace transform, Fourier integral transform, diffusion problems, Helmholtz equation with application to boundary and initial-value problems in cylindrical and spherical coordinates.

Prerequisites: Mathematics 70.308★ and one of 70.302★ or 70.307★ or permission of the Department.

Day division, Winter term: Lectures three hours a week.

Mathematics 70.472★

Integral Transforms

Laplace, Fourier, Hankel and Mellin transforms, selection of a suitable transform for a given partial differential equation boundary value problem. Operational properties of transforms. Inversion theorems. Approximate evaluation of inversion integrals for small and large values of parameter.

Application to the solution of integral equations.

Prerequisite: Mathematics 70.307★ or permission of the Department.

Not offered 1990-91.

Mathematics 70.473★

Qualitative Theory of Ordinary Differential Equations

Ordinary differential equations: existence-uniqueness theorems, vector formulation for systems; stability theory, Lyapunov theorems, perturbation theorems and structural stability; Poincaré-Bendixon theory.

Prerequisites: Mathematics 70.301★, 70.308★, 70.346★.

Day division, Fall term: Lectures three hours a week.

Mathematics 70.482★

Introduction to Mathematical Logic

Symbolic logic, propositional and predicate calculi, set theory and model theory, completeness.

Prerequisite: Mathematics 70.210 or permission of the Department.

Day division, Fall term: Lectures three hours a week.

Mathematics 70.483★

Computable Functions

Recursive functions and computability, algorithms, Church's thesis, Turing machines, computational logic. (Also listed as Computer Science 95.483★.)

Prerequisite: Mathematics 70.210 or 70.385★ or permission of the Department.

Not offered 1990-91.

Mathematics 70.484★

Design and Analysis of Algorithms

Design techniques: divide and conquer, back-tracking, dynamic programming, search methods. Algorithms for graph problems, optimization problems, algebraic problems. Lower bounds and the P-NP question. (Also listed as Computer Science 95.484★.)

Prerequisite: Mathematics 69.384★ or permission of the Department.

Day division, Fall term: Lectures three hours a week.

Mathematics 70.485★

Theory of Automata

Finite automata and regular expressions, properties of regular sets, context-free grammars, pushdown automata, deterministic context-free languages. Turing machines, the Chomsky hierarchy. Undecidability, intractable problems. (Also listed as Computer Science 95.485★.)

Prerequisite: Mathematics 70.385★ or 70.310 or permission of the Department.

Day division, Winter term: Lectures three hours a week.

Mathematics 70.486★

Numerical Linear Algebra

Study of matrix inversion techniques; techniques of finding eigenvalues and eigenvectors, solution of systems of linear equations; direct and indirect methods, their comparison and error analysis; applications in optimization and other areas. (Also listed as Computer Science 95.486★.)

Prerequisites: Mathematics 69.217★; and Mathematics 69.309★ or permission of the Department.

Day division, Winter term: Lectures three hours a week.

Mathematics 70.487★

Game Theory

Two-person zero-sum games; infinite games; multistage games; differential games; utility theory; two-person general-sum games; bargaining problem; n-person games; games with a continuum of players.

Prerequisite: Mathematics 70.301★ or permission of the

Department.

Not offered 1990-91.

Mathematics 70.488★

Graph Theory and Algorithms

Paths, circuits, Eulerian and Hamiltonian graphs, connectivity, colouring problems, matching, Ramsey theory, network flows.

Prerequisites: Mathematics 70.385★ or 70.310, or permission of the Department.

Day division, Winter term: Lectures three hours a week.

Mathematics 70.495★

Honours Project

Consists of a written report on some approved topic or topics in the field of mathematics, together with a short lecture on the report.

Prerequisite: Honours Mathematics students only, see p. 388.

Fall term.

Mathematics 70.496★

Directed Studies

Prerequisite: Honours Mathematics students only.

Fall and Winter terms.

Mathematics 70.497★

Directed Studies

Available only to Honours students whose program requires a half-credit not offered by the Department of Mathematics and Statistics.

Fall and Winter terms.

Courses Planned for Summer School and Evening Division, 1991-94.

Summer 1991

69.007★, 69.107★, 69.109★, 69.117★, 69.201, 69.202, 69.207★, 69.217★, 69.257★, 69.259★, 69.304★, 69.375★.

Evening 1991-92

69.007★, 69.017★, 69.107★, 69.109★, 69.117★, 69.119★, 69.207★, 69.208★, 69.217★, 69.218★, 69.244★, 69.257★, 69.353★, 69.354★, 69.381★.

Summer 1992

69.007★, 69.107★, 69.109★, 69.117★, 69.201, 69.202, 69.207★, 69.217★, 69.257★, 69.259★, 69.304★, 69.375★.

Evening 1992-93

69.007★, 69.017★, 69.107★, 69.109★, 69.117★, 69.119★, 69.207★, 69.208★, 69.217★, 69.218★, 69.257★, 69.307★, 69.344★, 69.357★.

Summer 1993

69.007★, 69.107★, 69.109★, 69.117★, 69.201, 69.202, 69.207★, 69.208★, 69.217★, 69.257★, 69.259★, 69.304★, 69.375★.

Evening 1993-94

69.007★, 69.017★, 69.107★, 69.109★, 69.117★, 69.119★, 69.207★, 69.208★, 69.217★, 69.218★, 69.257★, 69.350, 69.386★, 69.387★

Members of the Committee

I. Pressman, *Program Co-ordinator*,
Room 823 Dunton Tower, 788-2165 or 788-2155

W.H. Cunningham
S.E. Mills

General Information

Operations Research (O.R.) began as a discipline about 50 years ago, and is concerned with the study and application of scientific methods of making decisions. Operations Research techniques are used extensively in business and industry for scheduling of personnel and machinery, routing vehicles, designing networks, allocating resources, determining optimal product mixes, and financial planning.

There is considerable theoretical activity in the study of algorithms, complexity, stochastic modelling, economics, queueing, etc., which have many practical applications.

The program at Carleton University was designed in consultation with employers of O.R. professionals and the Canadian Operations Research Society. Graduates of this program will be prepared for careers either in government or in the private sector, and they will be qualified to continue in graduate programs.

Operations Research at Carleton University is exclusively an Honours program. Students who select a program with an orientation towards Mathematics-Physical Science-Computer Science should proceed towards a B.Sc. (Honours) degree. Those students who prefer a Management-Business-Social Science orientation would normally proceed towards a B.A. (Honours) degree. An Honours project (Mathematics 70.495★) is a required component of either degree program.

Students who are planning to apply for admission to this program should have good quantitative skills. The required courses provide a broad range of O.R. techniques and methodologies which include: statistical analysis, stochastic processes, linear and non-linear optimization, network theory, mathematical modelling and computer simulation. It is recommended that students acquire an understanding of the human side of the O.R. discipline through study within the Social Sciences.

Students who are considering this program are urged to meet with the program coordinator to discuss their interests. The committee is available to advise students within the program.

Admission Requirements

The admission requirements for this program are as specified for the B.A. Honours program (see p. 31) and the B.Sc. Honours program (see p. 35).

Course Requirements

A total of 20 credits is required in accordance with the conditions given below. All course selections must be approved by the Department of Mathematics and Statistics.

Students in the B.Sc. program must include a First-year experimental science in their First-year course selection.

1. Mathematics 69.102, 69.112 with an average grade of C+ or better.

Alternatively, students may be admitted to the Honours program in Operations Research after successful completion of First year with:

(a) a minimum grade-point average of 7.0 (B-) on all half credits offered from Mathematics 69.107★, 69.207★, 69.117★, 69.217★; and

(b) a minimum weighted grade-point average of 6.0 (C+) on all credits offered from Mathematics 69.102, 69.107★, 69.207★, 69.112, 69.117★, 69.217★.

Note:

Students offering Mathematics 69.107★ must then take 69.207★, and students offering 69.117★ must then take 69.217★.

2. Mathematics 70.200, 70.260, 69.257★, 69.259★;

3. Mathematics 70.210, 70.350, 70.356★, 69.381★, 69.386★ and an additional half-credit in Mathematics at the 300-level or above;

4. Mathematics 70.355★, 70.459★, 70.495★; Mathematics 70.583★ or 70.588★ or Economics 43.405★;

5. two introductory half-credits in Computer Science (preferably 95.105★, 95.106★) and Business 42.337★, Engineering 94.405★;

6. five approved credits in applied areas. At least two and one-half of these must be in the fields of Economics and Business. The following list includes a few of the many suitable applications-oriented courses. Other possibilities as well as various "paths" are given in the brochure, *A Guide to Careers in Operations Research*, available from the Department of Mathematics and Statistics.

Business

42.101★ Principles of Financial Accounting

42.102★ Management Accounting

42.214★ Introduction to Management

42.228★ Introduction to Marketing

42.230★ Introduction to Management Science

42.240★ Business Information Systems

42.250★ Introduction to Business Finance

42.308★ Cost Accounting

42.327★ Marketing Research

42.342★ Business Systems I

42.348★ Quantitative Applications of Computers in Business

42.446★ Decision Support Systems

Computer Science

95.202★ Data Structures and Data Types

95.207★ Programming Language Concepts

95.407★ Applied Artificial Intelligence

Economics

43.100 Introduction to Economics

43.201★ Introduction to Microeconomic Theory and Analysis

43.211★ Introduction to Macroeconomic Theory and Analysis

43.250★ Introduction to Business Finance

43.365★ The Economics of Planning

43.485 Introduction to Econometrics

Engineering

82.333★ Urban Planning

82.434★ Transportation

Geography

- 45.340★ The Location of Industry and Public Services
- 45.341★ Geographical Analysis of Regional Economies
- 45.442★ Transportation Geography
- 45.443★ Issues in Applied Economic Geography

Philosophy

- 32.284★ Society, Value and Technology

Physics

- 75.211★ Mechanics and Properties of Matter
- 75.222★ Wave Motion and Optics
- 75.235★ Electricity and Magnetism

Political Science

- 47.447★ Decision Theory and Policy Studies

Psychology

- 49.210★ Introduction to Social Psychology

Sociology

- 53.251★ Introduction to Population Studies
- 56.253★ Introduction to Human Ecology
- 53.346★ Industrial Sociology
- 53.355 Bureaucracy and Society

Technology, Society, Environment Studies

- 59.402★ Technology and Society: Forecasting

7. The remaining two credits may be chosen from any department, subject only to the restrictions that:

(a) of the total of 20 credits, not more than seven may be below the 200 level; and

(b) Science students must include at least one half-credit additional Science Continuation course.

The student may wish to take more applications-oriented courses, so as to in effect have a specialty, or may take more courses in Mathematics and Statistics or in Computer Science. Students in the B.Sc. program must take two Arts or Social Science elective credits, and should note the statement concerning Social Science Electives, as outlined on p. 348.

Herzberg Building, Room 316
Telephone: 788-4377

Officers of Instruction

Chairman
J.E. Hardy

Supervisor of Graduate Studies (Associate Director, Ottawa-Carleton Institute for Physics)
W.J. Romo

Supervisor of Undergraduate Studies
L. Resnick

Professors
J.C. Armitage
D.J. Brown
R.K. Carnegie
L.A. Copley
K.W. Edwards
D. Kessler
W.J. Romo
M.K. Sundaresan
P.J.S. Watson

Visiting Professor
G. Herzberg

Associate Professors
A.L. Carter
J.E. Hardy
M. Ogg
L. Resnick

Assistant Professors
P.C. Johns
P.A. Kalyniak
D. A. Karlen

Research Professors
P.G. Estabrooks
R.J. Hemingway

Research Associates
H. Kapitza
R. Kowalewski
W. Schappert
N. Sinha
R. Sinha

Instructors
J.G. Boutin
B.J. Jarosz

Natural Sciences and Engineering Research Council Fellows
P.A. Kalyniak
D.A. Karlen

Adjunct Research Professors
A.J. Alcock, *National Research Council*
R.L. Clarke
J. Cygler, *Ottawa Regional Cancer Centre*
W.F. Davidson, *National Research Council*
P.G. Estabrooks, *Institute of Particle Physics*
L.H. Gerig, *Ottawa Regional Cancer Centre*
C.K. Hargrove, *National Research Council*

R.J. Hemingway, *Institute of Particle Physics*
H.J.A.F. Mes, *National Research Council*
G.P. Raaphorst, *Ottawa Regional Cancer Centre*
D.W.O. Rogers, *National Research Council*
J.K. Saunders, *National Research Council*
W.D. Sinclair, *National Research Council*

Sessional Lecturers
R.S. Dick
I. Easson
T.A. Ledwell
M.S. Wartak

General Information

Physics 75.100, with Mathematics 69.107★ and 69.117★, are the normal prerequisites for entry into Second-year Physics courses. Mathematics 69.102 and 69.112 are suitable alternatives for students having superior competence in Mathematics. Students not directly admissible into Mathematics 69.107★ or equivalent, or not intending to take further courses in Physics, should take Physics 75.105, with Mathematics 69.007★ and 69.107★. Prerequisites for the Third-year Physics courses will normally be Physics 75.211★, 75.222★, and 75.235★.

The *Physics of Modern Technology* option, described below in detail, is a program that may be of particular interest to students wishing to study physics from an applied point of view and choosing careers in industry. For students entering this option, possibilities of combining studies in certain academic terms together with work in industry in other terms will be strongly explored.

Part-time students are accepted in the Department. Such students should consult with the Department for full details of the available programs.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 349-350), in addition to all departmental regulations and normal requirements as set out below.

Major Program

Fifteen credits as follows:

1. two acceptable Arts or Social Science credits;
2. one free optional credit;
3. twelve more credits chosen with the approval of the Department.

First Year

Physics 75.100;

One acceptable Arts or Social Science credit; and either (a), or (b) below;

(a) Mathematics 69.107★, 69.117★ and two of Biology 61.102, or 61.209★ and 61.230★, Chemistry 65.100†, Geology 67.100, two half-credits in Computer Science; (b) Mathematics 69.102, 69.112 and one of Biology 61.102, or 61.209★ and 61.230★, Chemistry 65.100†, Geology 67.100.

†This course is recommended as being particularly useful.

Second Year

Physics 75.211★, 75.222★, 75.235★, 75.236★;
Either Mathematics 69.201 and 69.217★, if pattern (a) was followed in first year; or Mathematics 69.208★, 69.244★ and one half credit chosen from Physics, Mathematics, Computer Science or Engineering, if pattern (b) was followed in First year;
One half credit in Physics, Mathematics, Computer Science or Engineering;
One acceptable Arts or Social Science credit or a free option.

Third Year

Physics 75.300 or 75.307★ or 75.308★, 75.361★, 75.362★, 75.338★, 75.342★;
Physics 75.386, provided science continuation requirements can be met, or Mathematics 69.375★ and 69.307★;
If Physics 75.300 is not taken, one half credit in Physics, Mathematics, Computer Science or Engineering;
One acceptable Arts or Social Science credit or a free option.

Honours Programs

Twenty credits as follows:

1. two acceptable Arts or Social Science credits;
2. one free option credit;
3. seventeen more credits chosen with the approval of the Department.

Physics Core

First Year

Physics 75.100;
One acceptable Arts or Social Science credit;
and either (a) or (b) below;
(a) Mathematics 69.107★, 69.117★ and two of Biology 61.102 or 61.209★ and 61.230★, Chemistry 65.100†, Geology 67.100, two half-credits in Computer Science;
(b) Mathematics 69.102, 69.112 and one of Biology 61.102 or 61.209★ and 61.230★, Chemistry 65.100†, Geology 67.100.
† This course is recommended as being particularly useful.

Second Year

Physics 75.211★, 75.222★, 75.235★, 75.236★;
Mathematics 69.257★ or Computer Science 95.103★;
Either Mathematics 69.201 and 69.217★ if pattern (a) was followed in First year; or Mathematics 69.208★, 69.244★ and one half credit chosen from Physics, Mathematics, Computer Science or Engineering if pattern (b) was followed in First year;
One acceptable Arts or Social Science credit or a free option.

Third Year

Physics 75.338★, 75.342★, 75.361★, 75.362★, 75.381★, 75.386;
and either (c) or (d) below;
(c) Physics 75.300 and one half credit chosen from Physics, Mathematics, Computer Science or Engineering, or one half acceptable Arts and Social Science credit, or a one half credit free option;
(d) Physics 75.307★ or 75.308★ and the equivalent of one credit chosen from Physics, Mathematics, Computer Science and Engineering, or one acceptable Arts and Social Science credit; or a free option.

Fourth Year

Physics 75.437★, 75.477★, 75.478★;
Physics 75.458★ or 75.462★ or 75.468★;
Physics 75.499 or 75.497★ or 75.498★
Either (e) or (f) below:
(e) Physics 75.400;
(f) Physics 75.407★ or 75.408★ and 75.447★ (students doing laboratory work in other departments may substitute one half credit chosen from Physics, Mathematics, Computer Science or Engineering for Physics 75.447);
One acceptable Arts and Social Science credit or a free option;
Sufficient credits chosen from Physics, Mathematics, Computer Science or Engineering to bring the total to five credits.

Physics of Modern Technology Option

The normal course requirements for this option are indicated below.

First Year

Physics 75.100;
One of Chemistry 65.100, Geology 67.100 or Biology 61.102, or 61.209★ and 61.230★;
Mathematics 69.107★, 69.117★;
Computer Science 95.103★ or 95.105★, and 95.102★ or 95.106★; (95.105★ is recommended only for students who already have a good knowledge of FORTRAN; 95.102★ and 95.106★ are prerequisites for different subsets of higher-level courses in Computer Science);
One acceptable Arts or Social Science credit.

Second Year

Physics 75.211★, 75.222★, 75.235★, 75.236★;
Mathematics 69.201, 69.217★;
One half credit free option;
One acceptable Arts or Social Science credit.

Third Year

Physics 75.300, 75.335★, 75.338★, 75.342★, 75.361★, 75.362★, 75.386;
One half credit free option.

Fourth Year

Physics 75.400, 75.424★, 75.427★, 75.437★, 75.458★, 75.499;
One credit chosen from Physics, Mathematics, Computer Science or Engineering.

Note:

Particularly recommended courses in Computer Science and Engineering are Computer Science 95.206★ and 95.306★.

In this option, the work in the Physics 75.300 and 75.400 laboratories will emphasize experiments and project work of interest to the high-technology industries. The main areas emphasized in the advanced laboratories will be: modern electronics, digital techniques and methods, use of computers in the control and analysis of experiments, modern optics, ultrasound, and sensing and imaging problems. In Physics 75.499 students will work on projects from lists composed from typical technological projects encountered frequently in industries.

Combined Honours in Geology and Physics

A grade of C+ or better in both Geology 67.100 and Physics 75.100, and overall Honours standing are required before admittance to the program.

Course requirements are as follows:

First Year

Physics 75.100;
Geology 67.100;
Mathematics 69.107★ and 69.117★;
Chemistry 65.100;
One Arts or Social Science credit.

Second Year

Physics 75.211★, 75.222★, 75.235★, 75.236★;
Geology 67.221★, 67.222★, 67.228★, 67.281★;
Mathematics 69.202.

Third and Fourth Years

Three credits in Physics at the 300 level or higher(not including the Honours Thesis), which must include one credit in the Third-year laboratory and at least a half credit at the 400 level;

Three credits in Geology (not including the Honours Thesis) chosen from Geology 67.323★, 67.324★, 67.333★, 67.334★, 67.380, and available Fourth-year courses. At least a half credit at the 400 level is required, for which Geology 67.481★ is strongly recommended. (Students should take careful note of course prerequisites when making their selection);

Two optional credits (one credit in Computer Science is recommended);

One Arts or Social Science credit;

Honours Thesis (Physics 75.499 or Geology 67.498).

A reading proficiency in French, German or Russian must be demonstrated by the end of the Third year. The thesis must be presented and defended before an inter-departmental committee.

Combined Honours in Physics and Computer Science

The program offers the student the possibility of obtaining skills for tackling problems of an applied nature such as those encountered in the high technology industries. Because students in this program will develop a strong background in physics and related mathematics, they are most likely to have the skills that will be in high demand in the next decade in a variety of areas. Students in this program follow a prescribed Combined Honours B.Sc. program which features equal emphasis on physics and computer science.

The program is administered by the Committee on Combined Programs with Computer Science (CCPCS); the Committee consists of representatives from the School of Computer Science, the Department of Physics, and the Department of Mathematics and Statistics.

Enrolment in this program is limited. Applicants should note that meeting the minimum published requirements for admission to this program does not imply automatic acceptance.

New students to Carleton should contact the Office of Admissions; students already at Carleton should apply through their Faculty Registrar's Office.

Applications for admission to this program will only be processed by the Committee during the periods mid-May to mid-June, and mid-August to mid-September of each year.

To continue in the program, a student must:

1. by the end of August each year, have gained at least one half credit in the past 12 months towards the degree requirements, and
2. have accumulated a grade-point average of 6.5 or better

in each of Computer Science and Physics and a grade-point average of 5.0 or better overall. (Grade-point averages include any failing grades that have not yet been replaced by a passing grade in the same or a substitute course.)

Failure to comply with these standards requires withdrawal from the program.

Note:

Some courses offered by the School of Business and the Department of Systems and Computer Engineering may be taken for credit as Computer Science courses in this program. For a complete list of these courses see p. 270.

Course requirements are as follows:

First Year

Physics 75.100;
Computer Science 95.105★, 95.106★ and 95.102★;
Mathematics 69.107★, 69.117★, 69.207★;
One Arts or Social Science credit or a free optional credit; (students wishing to leave open the possibility of transferring to an alternative Science program after completing First year are advised to use this free option to take one of Chemistry 65.100, Biology 61.102 or 61.209★ and 61.230★, Geology 67.100).

Second Year

Physics 75.211★, 75.222★, 75.235★, 75.236★;
Computer Science 95.202★, 95.203★, 95.204★;
Mathematics 69.208★, 69.217★;
One half credit in Arts or Social Sciences.

Third Year

Physics 75.307★ or 75.308★;
Physics 75.338★, 75.361★, 75.362★, 75.386;
Three of Computer Science 95.300★, 95.305★, 95.384★, 95.386★;
Computer Science 95.306★.

Note:

All students must complete all four of Computer Science 95.300★, 95.305★, 95.384★ and 95.386★ by the end of the Fourth year.

Fourth Year

One of Physics 75.407★ or 75.477★;
Physics 75.437★;
One of Physics 75.497★ or 75.498★ or Computer Science 95.495★;
Two half credits in Computer Science at the 200 level or above;
Two half credits in Computer Science at the 300 level or above;
Either one half credit in Arts or Social Sciences and a free optional credit or one and one half credits in Arts or Social Sciences, depending on the choice made in First year.

Combined Honours in Physics and Chemistry

A grade of C+ or better in both Physics 75.100 and Chemistry 65.100, and overall Honours standing-are required before admittance to the program. Course requirements are as follows:

First Year

Physics 75.100;
Chemistry 65.100;
Mathematics 69.107★ and 69.117★;
One credit free option; (Mathematics 69.102 and 69.112 may be taken in place of Mathematics 69.107★, 69.117★ and the one credit free option);
One acceptable Arts or Social Science credit.

Year	Major Program
I	
II	
III	
<p>pattern (a) in First year requires pattern (a) in Second year pattern (b) in First year requires pattern (b) in Second year</p> <p>† particularly recommended †† electives must assure 2 Arts or Social Science credits</p>	

Year	Core Honours Program
I	
II	
III	
IV	
<p>pattern (a) in First year requires pattern (a) in Second year</p> <p>pattern (b) in First year requires pattern (b) in Second year</p> <p>† particularly recommended</p> <p>†† electives must assure 2 Arts or Social Science credits</p>	

Second Year

Physics 75.211★, 75.222★, 75.235★, 75.236★;

Chemistry 65.210;

If Mathematics 69.107★ and 69.117★ were taken in First year, Mathematics 69.207★, 69.208★ and 69.217★ (or Mathematics 69.202 and 69.257★); If Mathematics 69.102 and 69.112 were taken in First year, Mathematics 69.208★ and two half credits free option;

One half course acceptable Arts or Social Science credit.

Third Year

Physics 75.307★ (or 75.308★), 75.361★, 75.362★, 75.386 (or Mathematics 69.375★ and 69.307★);

Chemistry 65.220, 65.311★, 65.312★, 65.353★.

Fourth Year

Physics 75.338★, 75.477★, 75.478★ (or 75.408★);

Chemistry 65.315★, 65.354★;

Two of Chemistry 65.410★, 65.411★, 65.412★, 65.413★;

One Honours project;

One half course Arts or Social Science credit.

Double Honours Program: B.Sc. Honours

Mathematics and Physics

This program requires a minimum of 21.5 credits including 18.5 credits in Mathematics and Physics.

Entrance Criteria

Successful completion of First year with a B+ or better in Mathematics 69.102, 69.112 and Physics 75.100, or permission of both departments.

Course Requirements

First Year

1. Mathematics 69.102, 69.112;

2. Physics 75.100;

3. Chemistry 65.100 or Biology 61.102 or 61.209★ and 61.230★;

4. One Arts or Social Science elective credit.

Note:

It is highly recommended that Computer Science 95.103★ be taken in the First year in addition to the foregoing courses. When this course is taken for credit, it will be included in the calculation of the overall grade-point average.

Second Year

1. Mathematics 70.200, 70.210, 70.260;

2. Physics 75.211★, 75.222★, 75.235★, 75.342★;

3. One half credit Arts or Social Science elective.

Third Year

1. Mathematics 70.301★, 70.302★, 70.310;

2. Physics 75.307★, 75.338★, 75.361★, 75.362★, 75.381★;

3. A half credit in Mathematics or Physics at the 300 level;

4. Mathematics 70.307★ together with Physics 75.388★, or Physics 75.386.

Fourth Year

1. One Mathematics credit at the 400 level (or equivalent);

2. Physics 75.437★, 75.447★, 75.477★, 75.478★;

3. Two half credits at the 300 or 400 level in Mathematics or Physics;

4. Honours project in Mathematics or Physics (half credit);

5. One half credit Arts or Social Science elective.

Graduate Program

Candidates for the Doctor's and Master's degrees are accepted for full-time work in Physics under the supervision of members of the Department. The requirements and general regulations are given in the Graduate Studies and Research Calendar.

Courses Offered

Physics 75.100

Introductory Physics

This course introduces mechanics, the properties of matter, thermodynamics, electricity and magnetism, as well as some aspects of wave motion, optics and modern physics. A balance is maintained between depth and range.

Prerequisites: OAC Physics, Algebra and Geometry, and Calculus (or equivalent). Mathematics 69.102, 69.104★, or 69.107★ must be taken in the Fall term (if not already completed). Any exceptions (e.g., for students from other provinces) will require permission from the Department.

Day and Evening divisions: Lectures three hours a week, laboratory three hours a week.

Physics 75.105

Elementary University Physics

An alternative First-year course, for students who do not intend to take additional courses in Physics, or who lack the prerequisites for Physics 75.100. Mechanics, properties of matter, thermodynamics, electricity and magnetism, DC and AC circuits, wave motion and light, elements of modern physics. Applications chosen in part from the life sciences. Prerequisites: Mathematics 69.007★ or equivalent, if not previously completed, must be taken concurrently in the First term. Mathematics 69.107★ or equivalent, if not previously completed, must be taken concurrently in the First or Second term.

Day division: Lectures three hours a week, laboratory three hours a week.

Physics 75.190

Introduction to Astronomy

A survey course in astronomy, astrophysics and cosmology, giving a descriptive treatment of the known stellar, galactic and extra-galactic systems. A review of the modern ideas concerning the structure, origin and evolution of the universe. Fields of current interest in astronomy, including the study of quasars, pulsars and supernovae are discussed. Additional topics include the development of space-age astronomy and studies of the possible existence of extraterrestrial life. A 14-inch telescope is available for student use.

Students intending to take further courses in astronomy are advised to take Physics 75.220. Credit will not be given for both Physics 75.190 and 75.220.

Evening division: Two one-and-a-half hour lectures a week.

Physics 75.195

Physics of Music

The physics of musical phenomena. Sound production, propagation, frequency, intensity. Characteristics of musical sounds, pitch, harmonics, attack. Musical instruments, qualities and behaviours, organ, piano, strings, brass, etc. The ear, physiology, behaviour, limitations. Building acoustics. Electronic recording, reproduction and production of music. Primarily for non-Science Majors and Honours students.

Prerequisite: Permission of the Department: Some

knowledge of either music and musical notation, or elementary physics is desirable.
Not offered 1990-91

Physics 75.211★

Mechanics and Properties of Matter

Classical mechanics of a particle and rigid body. Classical properties of matter. Relativistic mechanics.

Prerequisites: Physics 75.100, Mathematics 69.107★, and 69.117★ or 69.127★ or Mathematics 69.102 and 69.112. (Physics 75.105 is also acceptable provided a minimum grade of B- is obtained.)

Day division, Fall term: Lectures three hours a week, laboratory three hours a week.

Physics 75.220

Introduction to Astrophysics

This is a self-contained course intended as an introduction to modern astronomy and astrophysics for students with prior knowledge of introductory physics. Various topics such as spectroscopy and elementary nuclear physics are introduced and applied to astrophysical problems such as stellar structure and evolution. Topics of current interest, including pulsars, quasars and black holes are discussed. The last part introduces modern cosmology and discusses the observations on the universe that have led to the "big-bang" picture of its origin. There is normally some observational work associated with the course.

Prerequisites: Physics 75.100 or permission of the Department. (Physics 75.105 is also acceptable provided a minimum grade of B- is obtained.) Credit will not be given for both Physics 75.190 and 75.220.

Evening division: Two one-and-a-half hour lectures a week.

Physics 75.222★

Wave Motion and Optics

Physical optics based on electromagnetic theory, oscillator model for dispersion, absorption, scattering, Huygen's principle, reflection and transmission as coherent scattering. Interference, coherence length, diffraction, polarization, double refraction. Geometrical optics.

Prerequisites: Physics 75.100, Mathematics 69.107★ and 69.117★ or Mathematics 69.102 and 69.112. (Physics 75.105 is also acceptable provided a minimum grade of B- is obtained.)

Day division, Winter term: Lectures three hours a week, laboratory three hours a week.

Physics 75.235★

Electricity and Magnetism

The theory of electric and magnetic fields is covered in some detail. Electrostatics, field intensities in various configurations of charges, Gauss' law, electrostatic energy. Dielectric materials, dipoles, dipole-dipole interaction, molecular polarizability. Steady currents, properties of electrical conductors. Magnetic effects of currents and motion of charges in electric and magnetic fields. Time varying currents, electromagnetic induction. Magnetic materials and magnetic measurements.

Prerequisites: Physics 75.100, Mathematics 69.107★, and 69.117 or 69.102 and 69.112 (Physics 75.105 is also acceptable provided a minimum grade of B- is obtained). Day division, Fall term: Lectures three hours a week, laboratory three hours a week.

Physics 75.236★

Physics of Electrical and Electronic Measurements I

D.C. and A.C. circuit theory. Resonant circuits. Basic measuring devices, the oscilloscope; impedances, bandwidth, noise; vacuum tubes, transistors, useful approximations for circuit design; feedback, amplifier, oscil-

lator; operational circuits; digital circuits and measuring devices. Lectures emphasize the physical basis and useful approaches to instrument use and design. Laboratory emphasizes modern digital instrumentation.

Prerequisite: Physics 75.100 or permission of the Department. Physics 75.235★ is recommended as a prior course. Day division, Winter term: Lectures three hours a week, laboratory three hours a week.

Physics 75.291★

Physics of the Environment I

The study of physics is essential to the understanding of many contemporary environmental problems. This course examines energy transformations which directly or indirectly are the sources of much pollution. Among the topics considered are the use of fossil, bio-mass, solar and nuclear-energy sources; thermodynamical and practical limits to efficiency; thermal pollution; radioactivity and the effects of radiation; growth in energy use and estimates of reserves; the need for conservation and control.

Prerequisite: Physics 75.100 or permission of the Department. (Physics 75.105 is also acceptable provided a minimum grade of C- is obtained.)

Evening division, Fall term: Lectures three hours a week.

Physics 75.292★

Physics of the Environment II

This course can be taken as a continuation of Physics 75.291★ or independently. It carries forward the study of the relationship of physical principles to environmental problems. Topics considered include: air pollution, its measurement, abatement and possible effects on climate; transportation problems and alternatives; noise pollution, its measurement and possible consequences; communication.

Prerequisite: Physics 75.100 or permission of the Department. (Physics 75.105 is also acceptable provided a minimum grade of C- is obtained.)

Evening division, Winter term: Lectures three hours a week.

Physics 75.300

Third-Year Laboratory

The student is expected to complete a small number of projects. These are closely supervised at the beginning of the year, but the student is encouraged to become as independent as possible. Some of the fields for which apparatus is available are: physical optics, optical spectroscopy, electronics, digital techniques, nuclear spectroscopy, cosmic rays, microwaves, solid state phenomena, electrical measurements. Laboratory techniques: basic technical operations (mechanical, electronics, etc.) used in the design and construction of research apparatus. Students with satisfactory competence in shop techniques may be excused from this part of the course.

Prerequisite: Permission of the Department.

Day division: Laboratory and seminar six hours a week, workshop three hours a week.

Physics 75.301★

Advanced Physics Laboratory for Non-Physics Science Students

This course is designed to initiate students into the use of instrumentation and help them understand the physical principles involved in making key measurements. In consultation with an adviser from the student's Major department, the instructor of this course will endeavour to design the program to meet the needs of each student. Available apparatus as in Physics 75.300.

Prerequisite: Permission of the Department.

Day division, Fall term: Laboratory and seminar six hours a week.

Physics 75.302★

Advanced Physics Laboratory for Non-Physics Science Students

This course is designed to initiate students into the use of instrumentation and help them understand the physical principles involved in making key measurements. In consultation with an adviser from the student's Major department, the instructor of this course will endeavour to design the program to meet the needs of each student. Available apparatus as in Physics 75.300.

Prerequisite: Permission of the Department.

Day division, Winter term: Laboratory and seminar six hours a week.

Physics 75.307★

Selected Experiments from Physics 75.300

Prerequisite: Permission of the Department.

Day division, Fall term: Laboratory and seminar six hours a week.

Physics 75.308★

Selected Experiments from Physics 75.300

Prerequisite: Permission of the Department.

Day division, Winter term: Laboratory and seminar six hours a week.

Physics 75.335★

Physics of Electrical and Electronic Measurements II

Analysis of a selection of currently important electronic devices using such concepts as Fourier analysis, noise, the transmission line; lock-in amplifier, analog to digital converter, charge sensitive detector, etc. Interfacing and programming small computers. The physical basis of operation and of limitations are emphasized.

Prerequisite: Physics 75.236★ or permission of the Department.

Day division, Fall term: Lectures three hours a week, laboratory three hours a week.

Physics 75.338★

Electromagnetism

Vector notation, vector algebra, divergence and Stokes' theorems, the Laplacian, electrostatic field and magnetostatics. Examples involving Laplace's and Poisson's equations; vector potential; Faraday's laws of induction; Maxwell's equations. Propagation of plane electromagnetic waves in vacuum and dielectric media.

Prerequisite: Physics 75.235★ or permission of the Department.

Day division, Winter term: Three hours a week.

Physics 75.342★

Heat and Thermodynamics

Heat and kinetic theory, methods of thermodynamics and applications of laws of thermodynamics.

Prerequisites: Physics 75.100 (Physics 75.105 is also acceptable provided a minimum grade of B- is obtained), Mathematics 69.107★, and 69.117★, or 69.102 and 69.112.

Day division, Winter term: Lectures three hours a week.

Physics 75.361★

Modern Physics

The course is designed to provide a logical transition from classical to modern physics. Elements of special relativity. Kinetic theory of gases; determination of the mass and charge of subatomic particles. Rutherford scattering, atomic models. Failure of classical mechanics. Photoelectric effect and Compton scattering. Bohr's theory of the hydrogen atom. Atomic energy states, optical and X-ray spectra. X-ray scattering and diffraction. Elements of

nuclear physics and particle physics.

Prerequisites: Physics 75.211★, 75.222★, 75.235★, Mathematics 69.207★, 69.208★, 69.217★ or Mathematics 69.202, 69.217★, or permission of the Department.

Day division, Fall term: Lectures three hours a week.

Physics 75.362★

Elements of Quantum Mechanics

Analysis of interference experiments with waves and particles; fundamental concepts of quantum mechanics, Schrodinger equation; angular momentum, atomic beams; hydrogen atom; atomic and molecular spectroscopy; Pauli principle; simple applications in the physics of elementary particles.

Prerequisite: Physics 75.361★ or permission of the Department.

Day division, Winter term: Lectures three hours a week.

Physics 75.364★

Modern Physics

This course is designed primarily for engineering students and for students not majoring in physics. Rapid review of classical physics; special relativity. Particle aspects of electromagnetic radiation. Wave aspects of material particles. Atomic structure. Production of X-rays and X-ray spectra. Molecular binding, solid state physics; nuclear physics. Applications; fission and fusion reactors, coherent optics (lasers, etc.) and semi-conductors. Brief description of cosmic rays and elementary particle physics.

Prerequisites: Physics 75.100 or 75.233★ and Mathematics 69.201 or permission of the Department.

Not offered 1990-91.

Physics 75.381★

Mathematical Physics I

Vector calculus; curvilinear coordinates; irrotational, solenoidal vector field; theorems of Gauss, Stokes; introductory fluid mechanics. Introduction to Lagrangian and Hamiltonian mechanics; Poisson brackets, tensors and dyadics; rigid body rotations; coupled systems and normal coordinates; relativistic dynamics.

Prerequisites: Physics 75.211★, 75.222★, 75.235★, Mathematics 69.207★, 69.208★, 69.217★ or permission of the Department.

Day division, Fall term: Lectures three hours a week.

Physics 75.386

Introduction to Theoretical Physics

Theoretical techniques common to all branches of modern physics are introduced. Particular emphasis is placed on methods used in quantum mechanics with problems selected from wave propagation, electromagnetic theory, scattering theory and reactor physics. These include Fourier series and integrals, elementary generalized functions, contour integration, residue calculus, Fourier and Laplace transforms, methods for solving linear ordinary and partial differential equations, and Green's functions.

Prerequisites: Physics 75.211★, 75.222★, 75.235★, Mathematics 69.207★, 69.208★, 69.217★ or permission of the Department.

Day division: Lectures three hours a week.

Physics 75.388★

Mathematical Physics II

Linear differential equations of second order. Fourier series and integrals, elementary generalized functions; Fourier and Laplace transforms; Green's functions, with applications; boundary value problems.

Prerequisites: Physics 75.381★ or Mathematics 69.345 or 70.345 (may be taken concurrently); Mathematics

69.307★, or permission of the Department.
Day division, Winter term: Lectures three hours a week.

Physics 75.400

Fourth-Year Laboratory

The student is expected to complete detailed projects involving some original planning in both concept and experimental technique. Projects are similar to Physics 75.300 but are of a more sophisticated nature.

Prerequisite: Physics 75.300 or 75.307★ or 75.308★.

Day division: Laboratory and seminar six hours a week.

Physics 75.407★

Selected Experiments from Physics 75.400

Prerequisite: Physics 75.300 or 75.307★ or 75.308★.

Day division, Fall term: Laboratory and seminar six hours a week.

Physics 75.408★

Selected Experiments from Physics 75.400

Prerequisite: Physics 75.300 or 75.307★ or 75.308★.

Day division, Winter term: Laboratory and seminar six hours a week.

Physics 75.421★

Topics in Astrophysics and Cosmology

Stellar evolution, including, in particular, stellar modelling, main sequence stars, red giants and the end states of stars. Introduction to general relativity, black holes and related phenomena, big bang cosmology.

Prerequisites: Physics 75.220, 75.361★ and 75.362★ or permission of the Department.

Day division, Fall term: Lectures three hours a week.

Physics 75.424★

Physics of Sensing and Imaging

Introduction to the physical basis of a selection of sensing devices. Particular attention is paid to common features such as noise, bandwidth, sensitivity and quantum limitations. Examples are chosen from radar, remote sensing, geophysical techniques of gravitational and magnetic surveys, ultrasound and its use in medical imaging, computer tomography, NMR imaging. The fundamentals of photography and electronic imaging are also covered.

Prerequisite: Permission of the Department.

Day division, Winter term: Lectures three hours a week.

Physics 75.427★

Modern Optics

Diffraction theory, coherence, Fourier optics, spatial filtering; holography and its applications; laser theory: stimulated emission, cavity optics, modes; gain and bandwidth; design and characteristics of atomic and molecular gas lasers.

Prerequisites: Physics 75.361★ and 75.362★ or permission of the Department.

Day division, Fall term: Lectures three hours a week.

Physics 75.437★

Electromagnetic Radiation

Electromagnetic wave propagation in a vacuum, dielectrics, conductors, and ionized gases, reflection, refraction, polarization at the plane boundary between two media; waveguide and transmission line propagation; dipole and quadrupole radiation fields; antenna systems. Electromagnetic mass, radiation pressure. Tensor notation, transformation of the electromagnetic fields.

Prerequisites: Physics 75.338★, 75.381★ and 75.386 (except for Mathematics and Physics Double Honours students), or permission of the Department.

Day division, Fall term: Lectures three hours a week.

Physics 75.447★

Statistical Physics

Equilibrium statistical mechanics and its relation to thermodynamics. Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics are derived, and applied in appropriate physical situations. Fluctuations. Kinetics and transport processes, including the Boltzmann transport equation and some of its applications.

Prerequisites: Physics 75.342★, 75.361★, 75.362★ and 75.477★ to be taken concurrently, or permission of the Department.

Day division, Fall term: Lectures three hours a week.

Physics 75.458★

Solid State Physics

An introduction to solid state physics. Topics include crystal structure, phonons and lattice vibrations, conductors, semiconductors, insulators and superconductivity.

Prerequisites: Physics 75.361★ and 75.362★ or permission of the Department.

Day division, Winter term: Lectures three hours a week.

Physics 75.462★

Particle Physics

Properties of leptons, quarks and hadrons. The fundamental interactions, conservation laws, invariance principles and quantum numbers. Resonances in hadron-hadron interactions. Three body phase space. Dalitz plots. Quark model of hadrons, mass formulae. Weak interactions, parity violation, decay of neutral kaons, CP violation, Cabibbo theory.

Prerequisite: Physics 75.477★ or permission of the Department.

Day division, Winter term: Lectures three hours a week.

Physics 75.468★

Nuclear Physics

Ground state properties of nuclei, nuclear forces, nuclear levels. Qualitative treatment of Fermi gas model, liquid drop model, shell model and collective model. Alpha, beta and gamma radioactivities. Fission. Passage of particles through matter. Particle detectors. Elements of neutron physics and nuclear reactors.

Prerequisites: Physics 75.361★ and 75.362★ or permission of the Department.

Day division, Winter term: Lectures three hours a week.

Physics 75.477★

Introduction to Quantum Mechanics I

This course concentrates mainly on the basic interpretative postulates of quantum mechanics. These fundamental concepts are applied to simple one-dimensional problems, and angular momentum theory.

Prerequisites: Physics 75.362★, 75.386 or permission of the Department.

Day division, Fall term: Lectures three hours a week.

Physics 75.478★

Introduction to Quantum Mechanics II

Scattering theory and application; bound state problems; approximation methods.

Prerequisite: Physics 75.477★ or permission of the Department.

Day division, Winter term: Lectures three hours a week.

Physics 75.481★

Diffusion and Flow Phenomena

Continuity equation; flow equations; diffusion of thermal neutrons (collisional energy transfer, scattering probability, statistical energy degradation); Fermi age-velocity theory; fast neutron flow equation; thermal multiplication pile; criticality criteria; solutions of flow and continuity equations: neutron flow (moderation by graphite block). Also given as Physics 75.553★ (Reactor Physics I).

Prerequisites: Physics 75.381★, 75.386 or permission of the Department.

Not offered 1990-91.

Physics 75.487★

Computational Physics

The use and applicability of micro-, mini- and mainframe computers for solving physics problems. Introduction to computer architectures, operating systems and networks commonly encountered in physics experiments or applications. Programming techniques, use of libraries and graphics packages, with emphasis on packages in current use in major physics applications. Considerations of computer hardware, and interfacing computers to physics experiments. Statistical analysis, fitting and Monte Carlo methods, with particular consideration to examples from particle physics and medical physics. Problems in numerical analysis, differential equations, integration, etc., with emphasis on methods used for solving problems from different areas of physics.

Prerequisite: Permission of the Department.

Physics 75.491★

Special Topics in Physics

Each year, at the direction of the Department, a course on a special topic may be offered.

Prerequisite: Permission of the Department.

Physics 75.497★

Fourth-Year Project

Same as Physics 75.499 except that it extends over the Fall term only. (See Physics 75.499 for details.)

Prerequisite: Permission of the Department.

Day division, Fall term: A minimum of six hours laboratory or private study a week.

Physics 75.498★

Fourth-Year Project

Same as Physics 75.499 except that it extends over the Winter term only. (See Physics 75.499 for details.)

Prerequisite: Permission of the Department.

Day division, Winter term: A minimum of six hours laboratory or private study a week.

Physics 75.499

Fourth-Year Project

These are advanced projects of an experimental or theoretical nature with an orientation towards research. A written progress report, by mid-term for Physics 75.497★, 75.498★, and by mid-year for Physics 75.499, must be submitted to the student's supervisor prior to the last day for withdrawal from the course. A written and an oral report is required at the conclusion of the project.

Prerequisite: Permission of the Department.

Day division: A minimum of six hours laboratory or private study a week.

Loeb Building, Room 552
Telephone: 788-2644

B.Sc. Honours in Psychology

The Department of Psychology offers a program leading to the Honours Bachelor of Science degree. Full details of the Department's offerings may be found in the Faculty of Social Sciences section of the Calendar beginning on p. 215. Required courses for the B.Sc. with Honours in Psychology, in the sequence in which it is strongly suggested they be taken, are as follows:

First Year

1. Mathematics 69.107★ and 69.117★ (or equivalent);
2. two of Biology 61.102 or 61.209★ and 61.230★, Chemistry 65.100, Physics 75.100 or 75.105;
3. Psychology 49.100 as the Social Science elective;
4. one additional credit from Science, Social Sciences or Arts.

Required courses beyond First year, and the sequence in which it is strongly suggested they be taken, are as follows:

Second Year

1. Psychology 49.200 and two of 49.220★, 49.250★ and 49.270★;
2. Mathematics 69.257★ and 69.259★, or 69.217★ and 69.257★;
3. one credit from Arts or Social Sciences other than Psychology;
4. one optional credit.

Note:

Students who wish to substitute Psychology 49.300 in 2 must offer in 4 a credit above the First-year level in Biology, Mathematics, Chemistry or Physics chosen with the approval of the Department of Psychology.

Third Year

1. one Honours seminar course selected from the following: Psychology 49.320 (Behavioural Neuroscience), 49.350 (Developmental Psychology), 49.370 (Cognition) and 49.380 (Human Assessment);
2. one of Psychology 49.220★, 49.250★ or 49.270★ if not taken previously, and 49.230★;
3. one optional credit in Psychology;
4. one credit in Arts or Social Sciences other than Psychology;
5. one credit above the First-year level in Biology, Mathematics, Chemistry or Physics.

Fourth Year

1. Psychology 49.498;
2. one credit in Psychology chosen from the following Science Continuation courses: Psychology 49.321★, 49.322★, 49.323★, 49.324★, 49.325★, 49.372★, 49.375★, 49.401★;
3. one optional credit in Psychology;

4. one credit above the First-year level in Biology, Mathematics, Chemistry or Physics;

5. one optional credit.

Graduation Regulations

In order to graduate, students must fulfil all University graduation regulations (see pp. 38-39) and all Faculty regulations (see pp. 349-350), in addition to all departmental regulations and requirements as set out above.

Introduction

The subject areas and specific courses listed in this section of the calendar include:

- (a) courses supervised and/or administered by one of the four undergraduate faculties, but which are available as important areas of concentration to students registered in programs offered by other faculties;
- (b) courses offered by members of more than one discipline or faculty available to all students (subject to restrictions outlined within the course descriptions themselves and the regulations of the faculty in which the student is registered);
- (c) listings of courses offered by some or all of the faculties, grouped together by the general subject area they address;
- (d) a description of the services offered by the Centre for Applied Language Studies;
- (e) a list of courses given by specified departments that are offered chiefly for students who are not registered in programs in the department offering the course — "Courses for Non-Majors" pp. 430-431.

Interdisciplinary Committee on African Studies

The Committee on African Studies, made up of faculty members with research and teaching interests in Africa, acts as a co-ordinating unit for activities in this area. (Chairpersons 1990-91: Lynn K. Mytelka, Department of Political Science (Fall term) and Manfred A. Bienefeld, School of Public Administration (Winter term).

Courses on Africa

Although there is no degree program in African Studies at Carleton, there is a strong teaching and active research interest. Courses relating to Africa have been given in various departments and schools for many years and students can select these courses as part of their degree programs.

Students may also submit a pattern of courses of African Studies for a B.A. Pass or Honours program (Directed Interdisciplinary Studies), according to the procedures described for this degree in the Calendar, p. 104.

Detailed descriptions of the courses below can be found in the various departmental listings. Courses at the 500 level are described in the Calendar of the Faculty of Graduate Studies and Research.

Courses Offered

Art History

- 11.204★ Arts of Native Peoples: Africa and Oceania

Economics

- 43.363★ Introduction to Economic Development
43.457★ The Economics of Development
43.458★ International Aspects of Economic Development

English

- 18.496★ Studies in African or Caribbean Literature

Geography

- 45.329★ Geography of Development
45.330★ Developing Nations of Inter-Tropical Africa
45.395★ Selected World Regional Problems
45.520★ Problems of Development in Africa (46.563★)
45.540★ Territory and Territoriality (46.542★)
45.544★ Gender and Environment

History

- 24.275 History of Africa
24.372★ North Africa and the Near East in the Era of Western Dominance

International Affairs

- 46.529★ Conflict in Southern Africa
46.537★ Macroeconomics in a Development Context
46.542★ Territory and Territoriality (45.540★)
46.563★ Problems of Development in Africa (45.520★)
46.581★ Regional Cooperation among Developing Countries

Music

- 30.151★ Aural Training I
30.230★ Introduction to Ethnomusicology
30.231★ Musics of Eastern Cultures
30.251★ Aural Training II

Political Science

- 47.310 Government and Politics in Africa
47.318★ Women in Developing Polities: A Comparative Assessment
47.414★ Theory and Practice in Third World Development
47.415★ Selected Problems in Third World Development
47.440★ Comparative Public Bureaucracy
47.482★ International Politics of Africa
47.517★ Selected Problems in African Politics
47.522★ Politics of Third World Development
47.545★ Public Administration in Developing Countries
47.581★ Foreign Policies of African States

Public Administration

- 50.573★ Policy Seminar on Structural Adjustment in the Developing World

Sociology and Anthropology

- 56.235 Ethnic Group Relations
54.465★ Contemporary Problems in Anthropology
53.544★ Race, Ethnicity and Class in Contemporary Societies

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General Information

Individual departments at Carleton have offered courses about Asia for many years. The University is a member of the Shastri Indo-Canadian Institute. The Norman Paterson School of International Affairs supports graduate studies and research on Asia.

The growing interest in Canada in the peoples and societies of Asia has promoted a gradual increase in the courses on Asia and related activities on campus. No degree program for Asian studies exists but members of the Committee for Asian Studies — created by faculty members in 1970 to co-ordinate courses and research work — offer a wide variety of courses about Asia. Committee members are available to advise students in Pass or Honours programs in their departments.

Students may also submit a coherent pattern of courses selected from the list below for a B.A. Pass or Honours (Directed Interdisciplinary Studies), according to the procedures described for this degree in the Calendar, p. 104.

Members of the Committee

V.K. Chari (*English*)
P.J. Davidson (*Law*)
Nalini Devdas (*Religion*)
H. Edward English (*Economics*)
E. Peter Fitzgerald (*History*)
S.G. Haider (*Architecture*)
J. Keil (*Sociology-Anthropology*)
David B. Knight (*Geography*)
Jacob Kovalio (*History*)
Leonard Librande (*Religion*)
K. Marwah (*Economics*)
O. Mehmet (*International Affairs*), *Chairman*
S.B. Park (*Economics*)
Eugene Rothman (*Religion*)
Martin Rudner (*International Affairs*)
John Strong (*History*)
John Sigler (*Political Science*)
Elliot Tepper (*Political Science*)
David Van Praagh (*Journalism*)
A.I. Wallace (*Geography*)

Courses

All prerequisite conditions prescribed for these courses must be met. Detailed course descriptions for undergraduate courses are given under the appropriate department listing in this calendar. Descriptions for graduate courses (numbered 500 and above) can be found in the Graduate Studies and Research Calendar.

Applied Language Studies

23.110 Intensive Introductory Mandarin
23.120 Intensive Introductory Japanese

Economics

43.457★ The Economics of Development
43.458★ International Aspects of Economic Development
43.555★ The Economics of Development

Geography

45.540★ Territory and Territoriality

History

24.278 The Middle East: 1798 to the Present
24.285 History of China
24.286 History of Japan
24.361★ The Russian Empire
24.386★ Twentieth-Century Japan
24.485 Selected Problems in East-Asian History

Journalism

28.421 Specialized Reporting (Van Praagh)

Political Science

47.312 Government and Politics of East Asia
47.315 Government and Politics of South and South-East Asia
47.332★ East Asian Political Thought—China, Japan and Korea
47.483★ Foreign Policies of Major East Asian Powers
47.518★ State, Revolution and Reform in East Asia

Religion

34.105★ Introduction to the Hindu Tradition
34.106★ Introduction to the Buddhist Tradition
34.109★ Introduction to Islam
34.205 The Buddhist Middle Way: Its Indian Developments
34.278 The Middle East: 1798 to the Present
34.320★ Selected Problems in Indian Thought
34.342★ Selected Topics in Islam
34.117 Introduction to Sanskrit
34.217 Readings in Sanskrit Literature

International Affairs

46.508 Development Planning: Theory and Practice
46.512 Canada and International Development
46.527★ Conflict in the Middle East
46.536★ The Third World in the Global Political Economic System
46.557 International Economic Law: Regulation of Trade and Investment
46.560 Human Resource Development
46.561★ Historical Dimensions of Development and Underdevelopment
46.567★ Issues in Development in Southeast Asia
46.569 Social Cost-Benefit Analysis and Development Project Evaluation
46.580★ Pacific Economic and Political Relationships

Humanities

Humanities 02.100

An examination of selected works, from Biblical times to the present, illustrating the various dominant views on the nature of humanity and attempts to understand people and their environment.

Prerequisite: First-year standing or higher.

Not offered 1990-91.

Humanities 02.200★

An examination of selected works illustrating various dominant views on the nature of humanity and attempts to understand the world in the context of the twentieth century as seen from points of view of history, philosophy, social science and literature.

Prerequisite: Second-year standing or higher.

Not offered 1990-91.

Social Sciences

Social Sciences 03.300★

Computer Applications in the Social Sciences

An introduction to the use of mainframe and micro-computer applications in social science research. Topics covered may include statistical packages, database management, word processing, graphics, computer communications, spread sheets, computer data collection and laboratory control.

Prerequisites: Computer Science 95.101★ or any programming course and a research-methods course.

Not offered 1990-91.

Social Sciences 03.401★

Innovations in Social-Science Data Collection and Measurement

This course provides an opportunity to study recent innovations in social-science data collection and measurement. It is an interdisciplinary course of interest to senior students, researchers and practitioners who already have a preliminary foundation in social science methods. Topics emphasized vary from year to year, but developments in sampling theory, survey instrument design, and reduction of measurement bias are examples of intended topics.

Prerequisite: One full-course credit, or equivalent, in methodology in one of the social sciences, or permission of the program co-ordinator.

Normally offered only in the Summer session.

Social Sciences 03.402★

Innovations in Quantitative Analysis for the Social Sciences

This course provides an opportunity to study recent innovations in quantitative analysis of social science data. It is an interdisciplinary course of interest to senior students, researchers and practitioners who already have a preliminary foundation in quantitative analysis for the social sciences. Topics emphasized vary from year to year, but linear restriction modelling, log-linear techniques and developments in time series analysis are examples of intended topics.

Prerequisite: One full-course credit, or equivalent, in methodology in one of the social sciences, or permission of the program co-ordinator.

Normally offered only in the Summer session.

Arts and Social Sciences

Arts and Social Sciences 04.390

The Literature of Existentialism

A study of the origins, development, and principal characteristics of existentialist literature. (Also listed as English 18.390.)

All assigned readings will be in English.

Prerequisite: At least Third-year University standing.

Evening division: Lectures two hours a week.

B.W. Jones

Arts and Social Sciences 04.395

Visual and Performing Arts in the Twentieth Century

This interdisciplinary course is designed to examine selected aspects of the creation, distribution and reception of the arts in this century. The focus of the course is on the interplay of aesthetics, ideology and technology in music, theatre, film, art and architecture.

Prerequisite: Third-year standing and permission of the Visual and Performing Arts Sub-Committee (see p. 429).

Arts and Social Sciences 04.498

Honours Essay

A required interdisciplinary research essay for Honours students in the Fourth year of Directed Interdisciplinary Studies. The project is carried out by the student in consultation with a faculty supervisor. The project must be approved in advance by the Committee on Directed Interdisciplinary Studies; students must consult with the Program Co-ordinator in selecting a project and a supervisor. At least one week before the last day for course changes, students must submit to the Program Co-ordinator a written outline of the proposed study, approved by the supervisor. Arts and Social Sciences regulations governing Honours Theses and Research Essays apply to this project, which is equivalent to one credit. Registration in this course is limited to students in the Fourth year of the B.A. (D.I.S.) Honours program.

Science

Science 60.100

Man in His Environment

This course is designed to acquaint students in Arts, Social Sciences and Engineering, with the methodology of science in approaching a problem. The historical aspects of scientific discoveries are examined, particularly those that influence present society. A special emphasis is directed to the interactions of science and society and to man's influence and impact on the natural environment.

Not offered 1990-91.

Integrated Science Studies

The Integrated Science Studies (ISS) program offers undergraduate students in the Faculty of Science, whose academic aspirations cannot be satisfied within the constraints of one of the current programs, the opportunity to develop their own individualized program of studies. This program must be one which blends a concentration in Science with a linked area of specialization in another Faculty. A student who applies to the ISS program is asked to describe the proposed program. After the proposal is accepted by the Committee, the student will be admitted to

ISS to follow the program that has been approved. The Committee monitors the progress of all ISS students. Both an Honours program and a Major program are available for ISS students. Additional information can be found in the Faculty of Science listings. See pp. 383-384.

Technology, Society, Environment Studies

Our society increasingly faces problems requiring communication among specialists of different disciplines. This is at least in part a result of increasing specialization of people and jobs. The multidisciplinary problems raised by the interaction of an industrial society with its environment, its resource base, and its complex technical systems are addressed by six courses organized by the Technology, Society, Environment Committee. These courses develop the multidisciplinary perspective through problem units on topics such as energy, the industrial revolution, pollution, transportation, political regulation of technology, forecasting of technological and social change, technological innovation and the arms race. Each course involves team projects that bring together students working in different disciplines. The five courses are Technology, Society, Environment 59.300, 59.350★, 59.401★, 59.402★, 59.403★ and 59.404★. They are described on pp. 425-527.

Other Courses

African Studies, see p. 417.

Asian Studies, see p. 418.

Labour Studies, see p. 421.

Medieval Studies, see p. 424.

Urban Studies, see p. 428.

Visual and Performing Arts, see p. 429.

Directed Interdisciplinary Studies, B.A.

For information about the B.A. Directed Interdisciplinary Studies program see p. 104.

Labour Studies

Members of the Committee

Chair

F. Griezic (*History*)

Members

R. Abbott (*Public Administration*)

W. Clement (*Sociology*)

D. Cray (*Business*)

D. Fraser (*Law*)

N. Kiggundu (*Business*)

M. Mac Neil (*Law*)

R. Mahon (*Public Administration*)

L. MacDonald (*English*)

A. Moscovitch (*Social Work*)

R. Neill (*Economics*)

D. Olsen (*Sociology*)

R. Rupert (*Journalism*)

D. Smith (*Economics*)

D. Stasiulis (*Sociology*)

E. Swimmer (*Public Administration*)

D. Swartz (*Public Administration*)

T. Wilkinson (*Continuing Education*)

G. Williams (*Political Science*)

A. Dale (Student Representative)

I. Gelinis (Student Representative)

General Information

The Committee on Labour Studies, consisting of faculty members with research and teaching interests in labour, acts as a co-ordinating unit for activities in this area. An interdisciplinary Labour Studies Research and Resource Centre has been established for use by the University community and the public at large. The University offers a wide range of courses in the humanities and social sciences relating to labour, and students can select these courses as part of their degree program.

Students may also submit a coherent pattern of courses in Labour Studies for a B.A. Pass or Honours (Directed Interdisciplinary Studies) in accordance with the procedures described for the degree in the Calendar (p. 104). Assistance in planning such a pattern is available from members of the committee.

Courses Offered

In developing a pattern in Labour Studies, the student can choose from the following suggested basic and related courses.

Basic Courses

Business

42.312★ Personnel Management

42.317★ Introduction to Industrial Relations

Economics

43.331 Social Economics

43.356★ Introduction to Labour Economics

43.357★ Introduction to Industrial Relations

43.435 Manpower Economics and Labour Policy

43.465 Industrial Relations

History

24.331★ Quebec Since the 1860s

24.335 History of Canadian Labour

24.340★ History of Canadian Socialism

24.355★ History of British Columbia

24.425 Selected Problems in the Political Economy of Canadian Labour

24.439 Modern Canada Since 1939

Law

51.341★ Employment Law

51.345★ Labour Law

51.440★ The Arbitration Process in Labour Relations

51.445★ Labour Relations in the Public Service

Philosophy

32.209★ The Philosophy of Economic Activity

32.220 Introduction to Marxist Philosophy

32.284 Society, Value and Technology

Political Science

47.404★ Interest Groups in Canadian Politics

47.412★ Society and Politics in Liberal Democracies

47.413★ The State in Advanced Capitalist Societies

47.431★ Marxist Thought

47.432★ Contemporary Marxism

Sociology/Anthropology

53.257★ The Sociology of Work

53.258★ The Sociology of Occupations and Professions

53.346★ Industrial Sociology

53.348★ Collective Behaviour and Social Movements

53.381★ Sociology of Law (Law 51.316★)

56.458★ Workshop in Political Sociology-Anthropology

Related Courses

Business: 42.214★, 42.311★, 42.413★

Economics: 43.325, 43.344★

History: 24.234, 24.235, 24.270, 24.325★, 24.329★, 24.330★, 24.332, 24.337, 24.370, 24.433, 24.458

Law: 51.203, 51.205, 51.231★, 51.301, 51.321★, 51.353

Philosophy: 32.202, 32.330, 32.409

Political Science: 47.200, 47.313★, 47.335★, 47.345★, 47.400A, 47.401A

Sociology: 53.247, 53.333★, 53.345★, 53.347★, 53.433★ (Law 51.417★), 53.452★

Other courses in specific disciplines may be applicable, and students should consult advisers in these disciplines.

Paterson Hall, Room 215
Telephone: 788-6613

Officers of the Centre

Director
Ian Pringle

Co-ordinator, English as a Second Language, Intensive Programs
Devon Woods

Co-ordinator, English as a Second Language, Credit Programs
Trudy O'Brien

Co-ordinator, Language Testing Unit
Janna Fox

Co-ordinator, Writing Tutorial Service
Aviva Freedman

Co-ordinator, Carleton University Writing Consultants
Janna Fox

Associate Professors
Aviva Freedman
Ian Pringle

Assistant Professors
Devon Woods
Lynne Young

Instructors
George Chouchani
Patricia Currie
Trudy O'Brien

English Language Teachers
Robert Ahad
Kathy Au Coin
Geri Dumouchelle
Janna Fox
Andi Gray
Linda Librande
Catherine MacNeil
Clare Myers
Renata de Pourbaix
Tim Pychyl
Adrienne Soucy
Marilyn Weir

Japanese Language Instructors
Katsuhiko Mori
Satoko Mori

Mandarin Language Instructor
Han Hongju

Hebrew Language Instructor
To be announced

Arabic Language Instructor
George Chouchani

Indonesian/Malaysian Language Instructor
To be announced

General Information

The Centre for Applied Language Studies exists to foster the development of activities in language teaching and learning, including research and publication. The Centre functions by providing links between those units that have a service function in common, and co-ordinates activities in language studies for specific and functional purposes.

The Centre comprises five units: English as a Second Language, the Language Resource Unit, the Writing Tutorial Service, Carleton University Writing Consultants, and the Language Testing Unit.

In addition, the Centre assumes the responsibility for credit courses in Mandarin Chinese, Japanese, Arabic, Indonesian/Malaysian and Hebrew.

English as a Second Language

The English as a Second Language (E.S.L.) Unit offers a number of types of courses for students for whom English is not the native language, including credit courses (see course descriptions, p. 67), and non-credit courses. The non-credit courses are offered on a full-time basis (as the Intensive Courses) or on a part-time basis (individual courses related to specific language needs). In addition, the E.S.L. Unit develops and carries out specialized courses for client groups based on their academic or professional needs.

The E.S.L. Unit also engages in research activities related to analysis of students' language needs, development of methodologies and materials for teaching, and development of methodologies and materials for self-directed learning, and assessment of language activities through testing.

Language Testing Unit

The Language Testing Unit prepares and administers placement and proficiency tests in English as a Second Language for the Centre, administers the Michigan (MELAB) test, conducts research and development activities in language testing, and offers a consultancy service on language testing both within the University and outside.

Language Resource Unit

The Language Resource Unit houses print and non-print materials for language learning; the language laboratories are part of the unit. It offers specialized courses in many foreign languages; these courses vary in length and intensity and are designed to meet the special language requirements of particular groups.

Writing Tutorial Service

The Writing Tutorial Service offers a flexible and multifaceted approach to the teaching of writing at the University. The program consists of individualized tutorials, supplementary workshops on style, mini-courses on the principles of academic writing in general, and seminars on the

finer points of discipline-specific writing (such as the writing of law essays and examinations). In addition, the service is regularly called on to deal with special writing problems arising in specific courses or disciplines by designing individual ancillary programs in response to, and in consultation with, the instructors in those disciplines. The service also sponsors and conducts research on the acquisition, development, and improvement of writing abilities in the university context.

Carleton University Writing Consultants

Carleton University Writing Consultants is an extension of the Writing Tutorial Service that provides teams of consultants to diagnose writing problems in the workplace, analyze patterns of written communication in the workplace, and provide appropriate in-house writing instruction, usually on an individualized tutorial basis.

Interfaculty Committee on Medieval Studies

The Committee on Medieval Studies, made up of faculty members with research and teaching interests in the Middle Ages, acts as a co-ordinating unit for activities in this area. The Committee is a member of the Standing Committee on Centers and Regional Associations (CARA) of the Medieval Academy of America. (Chairman 1990-91: D. le Berrurier, Art History.)

Courses on the Middle Ages

The University offers a wide range of courses in the humanities and social sciences relating to the Middle Ages, and students can select these courses as part of their degree program.

Students may also submit a coherent pattern of courses in Medieval Studies for a B.A. Pass or Honours (Directed Interdisciplinary Studies), in accordance with the procedures described for this degree in the Calendar, p. 104. Assistance in planning such a pattern is available from members of the Committee on Medieval Studies.

Courses Offered

Art History

- 11.220★ Western Medieval Art
- 11.221★ Eastern Medieval Art
- 11.325★ Russian Art
- 11.327★ Gothic Architecture and Monumental Sculpture
- 11.328★ Gothic Minor Arts
- 11.422★ Topics in Eastern Medieval Art
- 11.423★ Topics in Western Medieval Art

Classics

- 13.302 The Later Roman Empire (also listed as History 24.302)
- 13.303 The History of the Byzantine Empire, 527-1453 A.D. (also listed as History 24.303)
- 13.321★ Studies in Greek History and Institutions. Special Topic for 1990-91: The Early Byzantine Era (also listed as History 24.309★)
- 13.402 Beginnings of Early Medieval Europe and the Near East (also listed as History 24.402)

This Department offers several courses in Greek and Latin. Medieval Latin may be taken on a tutorial basis.

English

- 18.312 Old English
- 18.322 Chaucer and the Literature of Medieval England
- 18.428★ Studies in Medieval Literature I.
- 18.429★ Studies in Medieval Literature II.

French

- 20.261★ La littérature du Moyen Age
- 20.333★ Histoire de la langue (A)
- 20.362 Le Roman. Special Topic for 1990-91: Le roman breton: Lais de Marie de France et Galeran de Bretagne

German

- 22.430 Medieval Language and Literature

History

- 24.205 England during the Middle Ages
- 24.302 The Later Roman Empire (also listed as Classics 13.302)

- 24.303 The History of the Byzantine Empire, 527-1453 A.D. (also listed as Classics 13.303)
- 24.305 Medieval Thought
- 24.309★ Studies in Greek History and Institutions. Special Topic for 1990-91: The Early Byzantine Era (also listed as Classics 13.321★)
- 24.402 Beginnings of Early Medieval Europe and the Near East (also listed as Classics 13.402)
- 24.405 Selected Problems in Medieval History

Italian

- 26.340 Development of Literary Genres from the Thirteenth Century to the Renaissance
- 26.441 Tutorial: Literature. Special Topic for 1990-91: The Short Story from the Thirteenth Century to the Renaissance
- 26.491 Special Studies

Law

- 51.491★ Tutorial in Law

Music

- 30.210★ Music in the Middle Ages
- 30.430★ Notation of Medieval and Renaissance Music

Philosophy

- 32.225 Reason and Revelation
- 32.473★, 32.474★ Special Topic in Medieval Philosophy

Political Science

- 47.334 Ancient and Medieval Political Thought

Psychology

- 49.401★ Special Topics in Psychology: Psychology from the Middle Ages

Spanish

- 38.415★ Medieval Spanish Literature from the Origins through 1300
- 38.416★ Medieval Spanish Literature, 1300-1500
- 38.491★ Seminar on a Special Topic. Special topic for 1990-91 is: The Literature of the Medieval Kingdom of Castile

Members of the Committee

Chair

Peeter Kruus (*Chemistry*)

Members

W. Lawson (*Business*)

B. Jones (*English*)

J. Lukasiewicz (*Engineering*)

M. Smith (*Geography*)

D. Westwood (*Architecture*)

J. Neelin (*Biology and Biochemistry*)

N. Santoro (*Computer Science*)

J. Taylor (*History*)

General Information

It is becoming increasingly apparent that:

1. The future of the Western societies depends on their ability to cope with the complex problems resulting from the interactions of Technology, Society and the Environment (TSE).
2. The effectiveness of the democratic political process is contingent upon the perception and comprehension of these phenomena by the electorate.
3. Because of the complexity and the wide range of the problems involved, their understanding cannot be gained through specialized education in traditional disciplines. A multidisciplinary approach is required.

The multidisciplinary courses listed below, offered under the direction of the TSE Studies Committee, seek to fulfil this need. They are designed to provide students from all faculties with a solid basis for understanding the major problems of industrialized society, and with firsthand appreciation through research project work, of the complexities involved. The TSE courses are open to all students beyond the First year; these courses are especially recommended for students at the Third- and Fourth-year levels. Students enrolled in three-year programs, however, who would like to take these courses are encouraged to take TSE 59.300 in the Second year.

Students may also submit a coherent pattern of courses in TSE Studies for a B.A. (Directed Interdisciplinary Studies), in accordance with the procedures described for this degree in the Calendar, p. 104. Assistance in planning such a pattern is available from members of the TSE Committee.

Courses Offered

Technology, Society, Environment 59.300

Interactions in Industrial Society

A course intended to introduce students from all faculties to the study of the major problems of industrialized society. Topics covered include: historical perspectives of technology and industrialization, technology as a motive force in history and as an element of culture, population growth, impact of technology on the natural environment (e.g. climate, ecological balances), utilization of renewable and non-renewable resources, current and potential future energy resources, modernization (especially with regard to developing countries), technology as an agent of global integration. Much of the analysis is based on case studies. Group workshops are a major part of the course and are

given considerable weight in the final grading. A number of lecturers from within and outside the University will participate.

Precludes additional credit for TSE 59.350★.

Prerequisite: Registration in Second or higher or equivalent.

Day division: Lectures and workshops three hours a week.

Peeter Kruus

Technology, Society, Environment 59.350★

Interactions in Industrial Society

Identical to TSE 59.300, but without participation in group workshops.

Precludes additional credit for TSE 59.300.

Technology, Society, Environment 59.401★

Technology and Society: Assessment

The course examines the complexities and practice of evaluating the relationship and impact of technology on society and the physical environment. Specific topics include: risk analysis; cost-benefit analysis; regulation of technology; retrospective assessment of projects; necessary aspects of an assessment project; examples of technology assessments. A project in the last portion of the course comprises a significant portion of the course work. A number of lecturers from government and the University will participate.

Prerequisite: Registration in Third or higher year or equivalent.

Evening division, Fall term: Lectures and workshops three hours a week.

Technology, Society, Environment 59.402★

Technology and Society: Forecasting

The objective of the course is to introduce the participants to the forecasting methods that are used in government and industry. Topics are also covered that should indicate how an activity such as forecasting fits into the context of industrial society. Roughly half the time in the course is used to present various methods used in forecasting: trend analysis, Delphi techniques, normative forecasting, scenario development, and modelling. These methods are illustrated by in-class projects and a major group forecasting project. This coverage of methods is interspersed with discussion of related topics, such as: successes (and failures) of forecasts in history, science fiction writers as forecasters, ideological views of forecasting and the future, analysis of the processes of invention and innovation, and technology policy. A significant number of guest lecturers are involved in the course.

Prerequisite: Registration in Third or higher year or equivalent.

Evening division, Winter term: Lectures and workshops three hours a week.

Technology, Society, Environment 59.403★

Technology and Society: Innovation

The course examines the process of technological and social innovation, with special emphasis on the Canadian context. Specific topics include: historical examples of innovation; the relation of technological and social innovation to economic development; analysis of the steps in innovation; impact of innovation on employment; impediments to and incentives for innovation in Canada. A number of lecturers from industry, government and the University will participate in the course. A significant portion of the final grade will be based on the results of group research projects.

Prerequisite: Registration in Third or higher year or equivalent.

Evening division, Fall term: Lectures and seminars three hours a week.

Technology, Society, Environment 59.404★**Technology and Society: The Arms Race**

The course examines various aspects of the arms race, with particular emphasis on the impediments to control of armaments. Specific topics include: the history of armaments and arms control treaties; current military arsenals; performance of weapons, including the bacteriological and chemical; development, manufacture and trade of armaments; military use of space; sociology of conflict; views of religion on warfare; negotiating tactics in disarmament; technological innovation vs weapon control; availability of information regarding armament; effect of the arms race on less-developed nations. The course is given in modules with lecturers from the University and outside organizations. A project in the form of a simulation of a disarmament conference is a major part of the course. Prerequisite: Registration in Third or higher year or equivalent.

Not offered 1990-91.

Other Related Courses

Other courses related to the TSE area offered by various departments and schools within the University are listed for the convenience of students. Detailed course descriptions are given under the appropriate faculty or department. Please note that all prerequisite conditions prescribed for these courses must be met.

Architecture

- 76.105★ Architectural Thought and Contemporary Society
- 76.302★ History of Canadian Architecture
- 76.318★ Design of Cities
- 76.319★ Theory of City Form
- 76.423★ Society and Shelter
- 77.113★ Structures in Architecture
- 77.135★ The Nature and Behaviour of Materials
- 77.300★ Lighting for Architecture
- 78.340★ City Organization and Planning Processes
- 78.350★ The Development of Human Shelter

Biology

- 61.190★ Biology and Man
- 61.192★ Natural History
- 61.216★ Human Genetics and Evolution
- 61.262★ Ecology in Architecture
- 61.391★ Biology in Society
- 61.393★ Biology and Development of Renewable Resources
- 61.430★ Topics in Applied Environmental Microbiology

Chemistry

- 65.280★ Environmental Chemistry

Classics

- 13.235 Ancient Science and Technology

Economics

- 43.100 Introduction to Economics
- 43.363★ Introduction to Economic Development
- 43.365★ The Economics of Planning
- 43.385★ The Economics of Natural Resources

Engineering

- 82.433★ Urban Planning (also Geography 45.433★)
- 82.334★ Transportation (also Geography 45.434★)

English Language and Literature

- 18.207 Literature and the Sciences

Environmental Science

- 62.150★ Environmental Science Seminar

Film Studies

- 19.333 Film and Society

Geography

- 45.102★ Geographic Analysis of Contemporary Issues: Environment, Economy and Resource Use
- 45.211★ Physical Basis of Environmental Management
- 45.220★ Geography of the Global Economy
- 45.230★ The Cultural Landscape
- 45.231★ Conflict and Accord in the Modern World
- 45.329★ Sustainable Development and Third World Environments
- 45.330★ Sustainable Development in Sub-Saharan Africa
- 45.333★ Municipal Land-Use Planning in Canada
- 45.334★ Renewable Resource Planning in a Local Area
- 45.351★ Northern Lands
- 45.404★ Environmental Impact Assessment
- 45.405★ Field Studies in Environmental Assessment
- 45.445★ Land Resource Use

Geology

- 67.100 Introduction to Geoscience
- 67.238★ Earth, Resources and Society

History

- 24.221 Roots of Scientific Thought
- 24.234 Canadian Social History
- 24.239★ Canadian Urban History
- 24.254 Introduction to the History of Women
- 24.421 Science and Technology in the Canadian Experience

Law

- 51.205 Introduction to Public Law
- 51.305★ Law and Regulation
- 51.325★ Consumer Law
- 51.355★ Law Reform and the Protection of Life
- 51.380★ Law of Environmental Quality
- 51.465★ Contemporary Issues in Public International Law

Mass Communication

- 27.111 Introduction to Mass Communication
- 27.211 The Mass Media in Modern Society
- 27.343★ Communication Technology and Culture

Philosophy

- 32.184★ Introduction to Environmental Ethics
- 32.200 Science and the Human
- 32.284★ Society, Value and Technology
- 32.332★ Issues in the Philosophy of Science
- 32.333★ Science and the Structure of Society

Physics

- 75.291★ Physics of the Environment I
- 75.292★ Physics of the Environment II

Political Science

- 47.306★ Social Power in Canadian Politics
- 47.367★ Canadian Defence Policy
- 47.403★ Politics and the Media
- 47.416★ Labour and the Canadian State

Psychology

- 49.210★ Introduction to Social Psychology

Sociology and Anthropology

- 54.206★ Cultural Adaptations and the Environment
- 53.251★ Introduction to Population Studies
- 56.253★ Introduction to Human Ecology
- 53.254★ Urban Sociology
- 53.260★ Community
- 54.333★ Economic Anthropology
- 54.335★ The Prehistory of Human Settlement
- 53.339★ Society and Shelter
- 53.346★ Industrial Sociology
- 53.351★ Methods of Population Analysis
- 56.360 Development and Social Change
- 53.380 Social Policy
- 53.451★ Workshop in Demography/Human Ecology

General Information

Many urban studies courses are offered at Carleton. A student must fulfil the stated requirements of a disciplinary Pass, Honours or Combined pattern but at the same time it is possible for the student to design a sound interdisciplinary program of study that will provide a broader understanding of urban phenomena and processes than would be gained from the point of view of a single discipline.

The Interfaculty Committee on Urban Studies has drawn up the following list of undergraduate courses in urban studies currently offered at Carleton. Students should consult the disciplinary listings in the Calendar for detailed course descriptions and prescribed prerequisites; note that these *may* be waived, at the discretion of the school or department concerned.

Urban studies are finely interwoven with the wider universe of knowledge. Accordingly, certain courses listed relate to important background issues as well as to explicit urban content and many other courses not listed (including on-campus and field courses) may provide valuable support.

Students may submit a coherent pattern of courses in urban studies for a B.A. Pass or Honours. (Directed Interdisciplinary Studies); in accordance with the procedures described for this degree in the Calendar, p. 104. Assistance in planning such a pattern is available from members of the Committee on Urban Studies.

S. Gordon, Department of Sociology and Anthropology and School of Architecture, Co-ordinator.

Courses Offered

Architecture

- 76.205★ Theories of Landscape Design
- 76.208★ Design of Cities
- 76.209★ Theory of City Form
- 76.308★ Origins of Modern Architecture
- 76.328★ Workshop: The Architecture of Urban Space
- 78.323★ Workshop: Landscape Architecture
- 78.340★ City Organization and Planning Processes
- 78.345★ Workshop: Urban Design
- 78.349★ Workshop: City Organization and Planning Processes

Art History

- 11.302★ Canadian Architecture
- 11.305★ American Architecture
- 11.350★ British Art and Architecture: 1600-1850

Economics

- 43.480 Research Seminar in Urban Economics

Engineering

- 82.333★ Urban Planning
- 82.434★ Transportation
- 82.435★ Transportation Geography

Geography

- 45.220★ Geography of the Global Economy
- 45.221★ Geographical Challenges of Contemporary Economies
- 45.320★ The Canadian City: Internal Structure and Contemporary Problems
- 45.333★ Municipal Land Use Planning in Canada
- 45.423★ Urban Revitalization

- 45.427★ Urban Development and Analysis
- 45.433★ Urban Planning
- 45.442★ Transportation Geography

Geology

- 67.417★ Introductory Soil Mechanics and Engineering Geology

History

- 24.329★ Canadian Urban History
- 24.330★ Social History of Canada

Law

- 51.374 Local Government Law

Physics

- 75.291★ Physics of the Environment I
- 75.292★ Physics of the Environment II

Political Science

- 47.302★ Canadian Municipal Government
- 47.303★ Canadian Urban Politics
- 47.410★ Canadian and Comparative Local Government

Sociology and Anthropology

- 56.253★ Introduction to Human Ecology
- 53.254★ Urban Sociology
- 53.260★ Community
- 53.339★ Society and Shelter (Architecture 76.423★)
- 53.456★ Workshop in Urban Sociology

Faculty of Arts' Sub-Committee on the Visual and Performing Arts

The Faculty of Arts' *Sub-Committee* on the Visual and Performing Arts, made up of faculty members with research and teaching interests in fine arts, acts as a co-ordinating unit for activities in this area.

Chairman

John Shepherd (*Music*)
A929 Loeb Building, 788-3735

Courses on Fine Arts

The University offers a wide range of courses in the Faculty of Arts and the School of Architecture relating to fine arts, and students may select these courses, when approved by their supervising departments, as part of their degree program.

Students may also submit a coherent pattern of courses on an area of fine arts for a B.A. Major or Honours (Directed Interdisciplinary Studies), in accordance with the procedures described for this degree in the Calendar, p. 104. Assistance in planning such a pattern is available from members of the Committee on Fine Arts.

Courses Offered

The Departments of Art History, Film Studies and Music, the various literature departments, and the School of Architecture all offer courses in fine arts. Detailed course descriptions are given under the appropriate faculty or department and are available from the Faculty of Arts' Ad Hoc Committee on Fine Arts. The Committee offers the following course:

Arts and Social Sciences 04.395

Visual and Performing Arts in the Twentieth Century

This interdisciplinary course is designed to examine selected aspects of the creation, distribution and reception of the arts in this century. The focus of the course is on the interplay of aesthetics, ideology and technology in music, theatre, film, art and architecture.

Prerequisite: Third-year standing and permission of the Committee.

Courses for Non-Majors

430

The courses that appear in the following list are available to students specializing in other disciplines. This section is intended to assist students to find courses of interest, which would otherwise be difficult to locate in the Calendar. Descriptions for these courses are contained in the appropriate departmental section.

Art History

- 11.115★ Art as Visual Communication

Biology

- 61.190 Biology and Man
61.192★ Natural History
61.216★ Human Genetics and Evolution
61.262★ Ecology in Architecture
61.393★ Biology and Development of Renewable Resources

Business

- 42.101★ Principles of Financial Accounting
42.102★ Management Accounting
42.210★ Management and Organizational Behaviour

Chemistry

- 65.107 The Chemistry of Art and Artifacts
65.231★ Analytical Chemistry

Classics

- 13.209 Greek and Roman Literary Genres
13.231 Methods and Techniques of Archaeology
13.235 Ancient Science and Technology
13.300 Classical Mythology

Comparative Literature

- 17.301 Twentieth-Century Masterpieces of Literature: Production and Response
17.361 Studies in Literary Genres
17.401 Foundations of Comparative Literature
17.402 Theories of Literature

Computer Science

- 95.100★ Introduction to Computers for the Humanities
95.101★ Introduction to Computers for the Social Sciences
95.103★ Introduction to Scientific Computing
95.140★ Introduction to Computers for Business Students
95.185★ Introduction to Discrete Structures

Economics

- 43.201★ Introduction to Microeconomic Theory and Analysis
43.211★ Introduction to Macroeconomic Theory and Analysis

English Language and Literature

- 18.100 English Authors from Chaucer to T.S. Eliot
18.101 English and Continental Texts
18.105 Writing and Language
18.206 Children's Literature
18.208 Myth and Symbol
18.268 Forms and Conventions of the Cinema
18.291 Poetry Workshop
18.292 Women and Literature
18.296 The Writer, Literature and Society

French

- 20.100 Elementary French
20.101 Introductory Immersion French
20.102 Intermediate French (A)
20.103 Intermediate French (B)

- 20.106★ Reading French
20.107 Intermediate Immersion French
20.108 Advanced French for Non-Majors
20.110 Advanced French for Journalism Students
20.151 French-Canadian Literature
20.152 French Literature
20.206★ Advanced Reading French
20.209 Techniques de l'expression orale et écrite pour Non-majors

Geology

- 67.383★ Gemmology

German

- 22.115 Introductory German
22.118 Reading German
22.120 Intensive Introductory German
22.205 Intermediate German A
22.206 Intermediate German B
22.209★ Spoken German
22.210★ Written German

History

- 24.102 The World in the Twentieth Century
24.130 Modern Canada

Italian

- 26.100 Introductory Italian
26.101★ Introduction to Italian I
26.102★ Introduction to Italian II
26.200 Intermediate Italian
26.206★ Italian Conversation
26.260 Introduction to Italian Literature
26.300 Advanced Italian
26.303★ Italian Grammar
26.362 The Italian Heritage in North America
26.403★ Translation

Law

- 51.231★ Business Law I
51.232★ Business Law II

Mathematics and Statistics

- 69.104★ Calculus for Engineering and Computer Science Students
69.107★ Elementary Calculus I
69.109★ Calculus: with Applications to Business and Economics
69.114★ Linear Algebra for Engineering and Computer Science Students
69.117★ Linear Algebra I
69.119★ Algebra: with Applications to Business and Economics
69.141★ Gambling I
69.142★ Gambling II
69.185★ Introduction to Discrete Structures
69.201 Intermediate Calculus
69.202 Intermediate Mathematics
69.250 Introduction to Statistical Analysis
69.265★ Probability Models
69.266★ Business Statistics I
69.267★ Business Statistics II
69.352★ Probability and Statistics
69.375★ Mathematical Methods I
69.376★ Mathematical Methods II

Music

- 30.100 Introduction to the Music of Western Civilization
30.115 Elementary Materials of Music

Physics

- 75.190 Introduction to Astronomy
- 75.195 Physics of Music
- 75.291★ Physics of the Environment I
- 75.292★ Physics of the Environment II
- 75.301★ Advanced Physics Laboratory for Non-Physics
Science Students
- 75.302★ Advanced Physics Laboratory for Non-Physics
Science Students
- 75.364★ Modern Physics

Religion

- 34.102★ Introduction to the Literature of the Hebrew Bible
(Old Testament)
- 34.103★ Introduction to New Testament Literature
- 34.105★ Introduction to the Hindu Tradition
- 34.106★ Introduction to the Bhuddist Tradition
- 34.107★ Christianity
- 34.108★ Introduction to Judaism and the Jewish People
- 34.109★ Introduction to Islam
- 34.202 Interpretations of Religion
- 34.203★ Women in Religious Traditions

Russian/Ukrainian

- 36.110 Scientific Russian
- 36.116 Introductory Ukrainian
- 36.216 Advanced Ukrainian
- 36.291★ Twentieth-Century East-European Literature in
English Translation
- 36.360★ Special Topic: Dostoevsky to Chekhov (in
English Translation)
- 36.361★ Special Topic: The Revolution and After (in
English Translation)
- 36.390 Slavic Language Tutorial

Science (Interdisciplinary)

- 60.100 Man and His Environment

Social Work

- 52.100 Introduction to Social Work and Social Welfare

Spanish

- 38.115 Introductory Spanish
- 38.120 Intensive Introductory Spanish
- 38.150 Intermediate Spanish
- 38.151 Intensive Intermediate Spanish

Technology, Society, Environment Studies

- 59.300 Interactions in Industrial Society
- 59.350★ Interactions in Industrial Society
- 59.401★ Technology and Society: Assessment
- 59.402★ Technology and Society: Forecasting
- 59.403★ Technology and Society: Innovation
- 59.404★ Technology and Society: The Arms Race

Other University-Wide Information

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Awards for Academic Excellence

Medals

The Governor-General's Medal-Bachelor Degree Program
Awarded annually to the graduating student with the highest academic standing in a Bachelor degree program. Donor: His Excellency the Governor General of Canada. Established 1952.

The Chancellor's Medal

Awarded annually in the name of the Chancellor of the University to a graduating student of outstanding academic achievement.

The President's Medal

Awarded annually in the name of the President of the University to the student with the highest standing in a pass program of studies.

University Medals

Awarded annually, when merited, to the graduating students standing highest in Arts, Social Sciences, Science, Engineering, Architecture, Commerce, Computer Science, Journalism, Industrial Design, interfaculty studies, Music and Public Administration. Established 1949.

Senate Medals

Awarded, when merited, to graduating students of outstanding academic achievement. Established 1952.

Lieutenant-Governor's Medal in Architecture

Awarded annually, when merited, to the student standing at the head of the graduating class in Architecture. Established 1979.

Undergraduate Entrance and In-Course Scholarships

Carleton University awards scholarships tenable at the University, in the Fall/Winter session of the year of offer, to entrance and in-course full-time undergraduate students who have demonstrated a high potential for university studies. The intention of the scholarship policy is to recognize, attract and provide incentives for excellence. The total value of the scholarship or scholarships awarded is determined by the student's most recent academic standing.

The following entrance scholarships will be offered in 1990-91:

Three Chancellor's scholarships with a total possible value of \$16,000 over four years, (\$4,000 a year). The scholarship may be continued each year of full-time enrolment, provided the student maintains A standing. *These scholarships require an application, which must be completed and returned to the Awards Office by May 14.* Priority will be given to academic performance, but the committee will also consider the applicant's other interests and activities during secondary school. Recipients of the Chancellor's scholarships are precluded from receiving a Faculty Scholarship.

Students may be offered the following scholarships provided that a complete application for admission has been received by the University's Office of Admissions and Academic Records directly or through the Ontario Universities Application Centre by June 15:

Four Faculty Scholarships with a total possible value of \$12,000 over four years (\$3,000 a year). The scholarship may be continued each year of full-time enrolment, provided the student maintains A standing. These scholar-

ships are offered to the top student entering the Faculty of Arts, the Faculty of Engineering, the Faculty of Science and the Faculty of Social Sciences.

Fifty scholarships with a total possible value of \$8,000 over four years (\$2,000 a year). The scholarship may be continued for three years of full-time enrolment, provided the student maintains A standing.

Four hundred scholarships with a total possible value of \$5,000 over four years (\$1,250 a year). The scholarship may be continued for three years of full-time enrolment, provided the student maintains A standing.

Five hundred scholarships with a total possible value of \$4,000 over four years (\$1,000 a year). The scholarship may be continued for three years of full-time enrolment, provided the student maintains A standing.

Fifteen awards valued at \$500 for the entrance year only, to be given to the top students entering Carleton from high schools in the Regional Municipality of Ottawa-Carleton. This award will be in addition to any other the student may receive from Carleton. Recipients of the Chancellor's and Faculty Scholarships are precluded from receiving these awards.

All in-course students and all graduating students who meet the academic requirements for the awarding of University in-course scholarships will be named to the Deans' Honour List for every year in which they qualify.

University in-course scholarships (based on full- or part-time study) will be awarded on the following conditions:

1. The student must be enrolled in a degree program at the time of selection;
2. The student will not be offered a scholarship beyond the Fourth year of study (Fifth in Architecture);
3. A minimum 10.0 grade-point average is required;
4. The grade points of all credits taken in the period considered for the scholarship will be used to calculate the grade-point average;
5. No F, FNS or Abs will be acceptable during the period considered for the scholarship;
6. No grades achieved through a grade-raising examination will be considered;
7. Each summer, the Selection Subcommittee will determine the value of the scholarships to be awarded for each grade-point average; and
8. Students in the Co-operative Education stream will not draw upon scholarship funds for a work period. On returning to full-time studies they will come under scholarship provisions.

Full-time Students:

1. The definition of a full-time student is a student who registers in a minimum of four credits during the Fall/Winter Session.
2. Scholarships will be based on all credits taken in the 12-month period May to April.
3. In order to hold the scholarship, the student must be returning to Carleton as a full-time undergraduate student.

Part-time Students:

1. The definition of a part-time student is a student who takes fewer than four credits during the Fall/Winter Session.
2. Candidates will be considered for scholarships based on the average of all credits (minimum of four) taken in the

past 24 month period (May - April). However, if the candidate was awarded a scholarship the previous spring, a minimum of four new credits must be considered for the new scholarship; the same credit may not be used twice for scholarship consideration.

3. The student must be continuing at Carleton in his or her undergraduate degree program.

Note:

Since the income from funds may vary from year to year, the values shown for scholarships, awards and bursaries may change.

Scholarships and Awards by Programs

Scholarships and awards of varying amounts, which are of interest to students in specific programs, are listed below:

Architecture

Michael Russell Coote Memorial Award
 Jack Deutsch Memorial Masonry Award
 The Education Foundation of the Federation of Chinese Canadian Professionals of Ontario Entrance Scholarship
 The Education Foundation of the Federation of Chinese Canadian Professionals of Ontario Scholarship
 Ontario Association of Architects Awards
 Page and Steele School of Architecture Scholarship
 Jacques and Hélène Sabourin Memorial Scholarship

Arts

A. Andras Memorial Grant
 Award of the Embassy of Austria (German)
 The Honourable Walter Baker Memorial Scholarship in Political Science
 Jack Barwick and Douglas Duncan Memorial Scholarship in Art History
 Jack Barwick and Douglas Duncan Memorial Scholarship in Music
 Claude Brunelle Memorial Scholarship (Soviet and East European Studies)
 Landen Dominic Burnett Memorial Award (Art History)
 Canadian Association of Broadcasters Scholarships (Mass Communication)
 Carleton Beaverbrook Awards for Freedom of the Press (History)
 CHEZ-FM Research Award(s) in Mass Communication
 Bertha F. Davis Award in Religion
 Department of French Awards
 Awards of the Embassy of France (French)
 Awards of the Embassy of the Federal Republic of Germany (German)
 Richard Glover Scholarship (History)
 Louis and Miriam Goldstein Book Award in Judaic Studies (Religion)
 Peter Gerard Harris Memorial Award (Mass Communication)
 Sara Helen Parry Hughes Travel Award (Spanish)
 Award of the High Commission of India (Religion)
 Allama Mohammad Iqbal Award (Religion)
 Award of the Embassy of Italy (Italian)
 Marston LaFrance Memorial Award in English
 David Carton MacDonald Memorial Award (English)
 Macdonald Club Awards in Music
 R.L. McDougall Award in English
 Macedonian Association of Ottawa Scholarship in Greek Studies
 Music Department Award

Jayashree A. Nagpur Memorial Award (English)
 National Council of Jewish Women of Canada Award (Religion)
 Bettina Oppenheimer Memorial Scholarship in Music
 Ordine Italo-Canadese Scholarship (Italian)
 Robert E. Osborne Award (Religion)
 Ottawa Muslim Women's Auxiliary Award (Religion)
 Ottawa Women's Canadian Club Scholarship (Canadian Studies)
 Award of the Government of Quebec for Excellence in the Study of French
 Department of Russian Undergraduate Award
 Samuel Sair Canadian Jewish History Prize
 Award of the Embassy of Spain (Spanish)
 Barbara Sudall Book Prize (English)
 Award of the Ambassador of Switzerland to Canada (French, German, Italian)
 Underhill Prize (History)
 Awards of the Embassy of the Union of Soviet Socialist Republics (Russian)
 Wilgar Memorial Award in English
 Helga A.M. Wolff Memorial Scholarship in Latin (Classics)
 Gordon J. Wood Scholarships in English
 Susan Joan Wood Memorial Scholarship (English)
 Hume Wrong Scholarship (History)

Business

Victor S. Castledine Scholarship
 Certified General Accountants Association of Ontario Award for Excellence
 Ernst & Young Award
 Manufacturers Life Scholarship in Business
 D.F. McKechnie Award in Accounting
 James Nolan Memorial Award
 Charles Pinhey Award
 Lawrence Segal Memorial Fund
 Thorne Ernst & Whinney Scholarships
 Touche, Ross & Company Scholarships
 Women's Business Network Association of Ottawa Scholarship

Computer Science

Bull Scholarship
 Jamie Corbet Memorial Award
 Digital Equipment of Canada Limited Award of Merit
 Dy-4 Systems Limited Entrance Scholarship
 Goldie Wilkinson Scholarship

Engineering

Adjeleian Allen Rubeli Prize
 American Society for Metals Award in Engineering
 Association of Professional Engineers' Scholarships
 Dr. John H. Chapman Memorial Prize in Communications Engineering
 CSME Gold Medal
 W.R. Davis Engineering Scholarship
 Engineering Institute of Canada Award
 Gandall Scholarship
 Krishnakumar Gopalan Memorial Scholarship
 Kipling Award
 Donald G. Loughheed Memorial Scholarship
 Roderick C. McDonald Memorial Scholarship in Engineering
 McNaughton Scholarship
 Ontario Hydro Electronics Engineering Award
 Ottawa Construction Association Award
 Dr. C. Stewart Parsons Scholarship in Engineering Planning and Construction Department of Carleton University's Award in the Building Sciences

James H. Rattray Memorial Scholarship
Rolls-Royce Scholarship
Eric Sigurdson Award
Harry Stevinson Scholarship in Aeronautical Engineering
Vered Foundation Scholarships

Industrial Design

Cooper Canada - George Lynn Design Award
George A. Lynn Memorial Scholarship

Journalism

John E. Bird Memorial Scholarship
Domtar Inc. Scholarship in Journalism
Wilfrid Eggleston Award in Journalism
Bob Farquharson Memorial Award in Journalism
The Education Foundation of the Federation of Chinese Canadian Professionals of Ontario Scholarship
Blair Fraser Memorial Award for Journalism Graduates
Margaret Graham Award
Investigative Journalism Prize
Mitch Jacobson Memorial Award in Photojournalism
Judith Johansen Memorial Award
Journalism Writing Style Book Award
Charles Lazarus Scholarship
Frederick C. Nossal Award in Journalism
Ottawa Citizen Scholarship in Journalism
Peter Reilly Scholarship
Herman and Zelda Roodman Award in Journalism
Kenneth F. Smith Memorial Award in Journalism
Richard R. Snell Memorial Award in Journalism
Thomson Award for Reporting
Kenneth R. Wilson Memorial Award for Journalism Graduates
Phyllis Wilson Award in Journalism

Science

Motoshi Asano Memorial Scholarship in Chemistry
Paul R. Beesack Memorial Scholarship in Mathematics
Berke Scholarship in Chemistry
Dr. M. Ralph Berke Award in Chemistry
Director's Award in Biochemistry
Charles Anthony Blundell Betts Memorial Scholarship in Physics
J.P. Bickell Foundation Scholarships (Geology)
Award of the Canadian Institute of Mining and Metallurgy (Ottawa Branch)
Canadian Society of Petroleum Geologists Undergraduate Student Award
Society of Chemical Industry Award
Chemical Society of Canada Medal
Chevron Canada Resources Limited Scholarship in Geology
Catherine Daumery Memorial Award for Botanical Collection
Dr. Reginald T. Elworthy Award in Chemistry
E. Alison Flood Award in Physical Chemistry
GAC-MAC Undergraduate Scholarship in Earth Sciences
Ian H. Griffith Memorial Scholarships
Simon Guest Memorial Book Prize (Geology)
Trevor A. Harwood Memorial Award
Hewlett-Packard (Canada) Calculator Award
E.P. (Ted) Hincks Memorial Scholarship in Physics
E.P. Hincks Award of the Institute of Particle Physics
J.M. Holmes Entrance Scholarship in Chemistry
Professor James M. Holmes Scholarship in Chemistry
Janet M. Holmes Memorial Scholarship (Chemistry)
Dr. Harry Katznelson Memorial Scholarship (Biology)
Department of Mathematics and Statistics Entrance Award
Betty Nesbitt Memorial Award in Biology

H.H.J. Nesbitt Scholarship in Biology
F.K. North Award in Geology
Ottawa Section of the Petroleum Society of CIM Annual Award
R.L. Rosenberg Memorial Scholarship in Mathematics
Richard J. Semple Memorial Award in Mathematics
L.N. Wadlin Scholarship in Mathematics
Elizabeth White Memorial Award for Zoological Collection
Morley E. Wilson Scholarship (Geology)

Social Sciences

Addison-Wesley Award in Law
Mrs. George S. Abbott Memorial Award in Law
Professor T.N. Brewis Scholarship in Applied Economics
Butterworths Prize in Law
CCH Canadian Limited Award in Taxation
Carswell Company Book Award in Public Law
Victor S. Castledine Scholarship (Economics or Business)
CHEZ-FM Research Award(s) in Sociology and Anthropology
Communications Law Prize
Economics Essay Prize
Economics Scholarship
Economics Society Award
Elizabeth's Award in Family Law
Mr. and Mrs. Louis L. Goldstein Book Award in Law
Herbert G. Heron, Q.C. Award in Law
R.A. MacKay Award in Political Science
Betty Nesbitt Memorial Award in Biology
Bank of Nova Scotia, Carleton University Branch Award in Commercial Law
Oxford University Press Award in Law
Prince Memorial Achievement Award (Economics)
R.L. Rosenberg Memorial Scholarship in Mathematics
Celia Ruygok Memorial Scholarship (Criminology and Criminal Justice)
Richard J. Semple Memorial Award in Mathematics
Vered Foundation Scholarship (Political Science)
Jessie and Wreford Watson Award in Geography
R.A. Wendt Book Prize (Psychology)
Hume Wrong Scholarship (Political Science)

Undergraduate In-Course Scholarships for Part-Time Students

Undergraduate University Scholarships
University Women's Club of Ottawa Scholarships

Undergraduate Scholarships and Awards

Mrs. George S. Abbott Memorial Award In Law
Value \$100. To be awarded annually for proficiency in Law courses taken at Carleton University to a student planning to enter law school. Donor: Sons of Mrs. Abbott. Established 1968 in memory of Mrs. George S. Abbott. Revised 1989.

Addison-Wesley Award in Law
A prize of ten Addison-Wesley titles awarded annually, on the recommendation of the Department of Law, to a deserving student in a combined program of study, one of the disciplines of which is law. Donor: Addison-Wesley Publishers Limited. Established 1984.

Adjelian Allen Rubeli Prize
Awarded annually, on the recommendation of the Chair of the Department of Civil Engineering, to the students submitting the best and second best Fourth-year engineering

project. Donor: Adjeleian Allen Ruebli & Associates. Endowed 1989.

American Society for Metals Award in Engineering
Value \$100. Awarded annually to an outstanding student with an interest in materials engineering. Donor: Ottawa Valley Chapter, American Society for Metals. Established 1951. Revised 1984.

A. Andras Memorial Grant

Value \$1,100. To support the cost of a research project or paper undertaken by an undergraduate or graduate student attending Carleton University. This grant is awarded in alternate years for a research project in one of the following areas: (a) Jewish studies; (b) trade union history or the democratic socialist movement in Canada. Endowed 1972 in memory of the late Mr. A. Andras, a member of Carleton's Board of Governors. Revised 1978.

Motoshi Asano Memorial Scholarship in Chemistry

Awarded annually on the recommendation of the Department of Chemistry to a student in a Chemistry program. Preference shall be given to a full-time student in physical spectroscopy. Donated by the Asano family of Kobe, Japan, in memory of their son, Motoshi Asano, who received his Ph.D. in physical chemistry at Carleton in 1983, and who tragically lost his life in a mountain climbing accident two months later. Endowed 1984.

Medal of the Association of Professional Engineers (Ontario)

Awarded annually, when merited, to the graduating student standing highest in Engineering. Established 1961.

Association of Professional Engineers' Entrance Scholarship

Value \$1,000. Awarded annually to a student of high proficiency with senior matriculation standing who is entering the Engineering program. Donor: The Ontario Professional Engineers' Foundation for Education. Established 1961. Revised 1989.

Association of Professional Engineers' Scholarships

Value \$500 each. Two scholarships are awarded annually to Engineering students of high proficiency proceeding from one year of program to another in Carleton University. Donor: The Ontario Professional Engineers' Foundation for Education. Established 1961. Revised 1989.

Award of the Embassy of Austria

For excellence in the study of German, a book award is offered annually by the Austrian Embassy in Canada. Established 1960.

The Honorable Walter Baker Memorial Scholarship in Political Science

Value \$1,200. Awarded annually on the recommendation of the Department of Political Science to one or more students finishing the Third year of an Honours program. The selection will be made on the basis of high academic standing, with consideration given to demonstrated political leadership or involvement in politics. This scholarship is given in memory of The Honorable Walter Baker, P.C., Q.C., M.P., B.A., a distinguished graduate of Carleton University. Endowed in 1984 by friends of the Honorable Walter Baker.

Frederick William Baldwin Scholarship

Awarded annually to outstanding students entering or proceeding from one year of program to another at Carleton University. Donor: Estate of Frederick William Baldwin. Endowed 1983.

Bank of Nova Scotia, Carleton University Branch, Award in Commercial Law

Value \$100. Awarded annually to a student with high standing in courses in the Commercial Law field. Donor: the Bank of Nova Scotia, Carleton University Branch. Established 1980.

F. Luella Barrigar Scholarships

Awarded annually to students entering Carleton University or proceeding from one year of program to another. Some preference shall be given to students with an interest in music. These scholarships are provided through the bequest of the late Miss F. Luella Barrigar, a teacher of music at the Ottawa Teachers' College. Donor: The late F. Luella Barrigar. Endowed 1981.

Jack Barwick and Douglas Duncan Memorial Scholarship for Art History

Value \$1,300. Awarded annually to a student or students in the Department of Art History. The Chairman and faculty members of the Department of Art History are to decide each year on the most appropriate disbursement of the award. Donor: Mrs. J.P. Barwick. Endowed 1972.

Jack Barwick and Douglas Duncan Memorial Scholarship for Music

Value \$1,300. Awarded annually to a student or students in the Department of Music. The Chairman and faculty members of the Department of Music are to decide each year on the most appropriate disbursement of the award. Donor: Mrs. J.P. Barwick. Endowed 1972.

Paul R. Beesack Memorial Scholarship in Mathematics

A scholarship and book prize awarded annually to the student, continuing to the Second year of an Honours Program in the Department of Mathematics and Statistics, with the highest combined standing in the required (full-credit) mathematics courses of First year. Endowed in 1986 by the family, friends and academic colleagues of the late Paul R. Beesack, an outstanding analyst, who served this University, his department and his discipline with excellence.

Berke Scholarship in Chemistry

Value \$550. Awarded annually to an outstanding student proceeding to the Second year of an Honours Chemistry program. Donor: Dr. and Mrs. M. Ralph Berke. Endowed 1981.

Dr. M. Ralph Berke Award in Chemistry

The yield of a \$500 fund is awarded each year, if merited, on the recommendation of the Department of Chemistry for a prize to be awarded to an outstanding student majoring in chemistry proceeding from the Second to the Third year of the degree program. Donor: Dr. M. Ralph Berke. Endowed 1956.

Charles Anthony Blundell Betts Memorial Scholarship in Physics

Value \$1,300. Awarded annually, if merited, to a student of high proficiency in Physics, entering or continuing in Physics Honours or in the Major program, in the Second or subsequent years of the degree program. Donors: Mr. and Mrs. Oliver Betts, Birmingham, England, in memory of their son, Charles Anthony Blundell Betts. Endowed 1964.

J.P. Bickell Foundation Scholarships

The Trustees of the J.P. Bickell Foundation have established in the Department of Earth Sciences, Faculty of Science, scholarships for students entering the geological profession, of a possible value of \$3,000 each. The scholarships may be awarded on entrance into the Honours

Geological sequence at the First-, Second- or Third-year levels at Carleton University. The scholarships are payable over two or three years depending on the entrance level.

John E. Bird Scholarships

Value \$1,450. Two scholarships are awarded annually to outstanding students who are proceeding from one year of program to another in a Degree program in Journalism. Donor: Estate of Mrs. V. Bird. Endowed 1981.

Director's Award in Biochemistry

Value \$100. Awarded annually to the Fourth-year Biochemistry student performing the most distinguished Honours Research project. Donor: Anonymous. Endowed 1981.

Claude Bissell Scholarships

These scholarships are named in honour of a former President of Carleton University and are awarded to outstanding students proceeding from one year to another of a full-time undergraduate program at Carleton. Established 1975. Revised 1985.

Professor T.N. Brewis Scholarship in Applied Economics

Value \$1,000. Awarded annually on the recommendation of the Department of Economics to an undergraduate or graduate student in the department. Preference shall be given to a student who has shown aptitude in the field of applied economics. Professor Brewis was a distinguished member of the Department of Economics at Carleton University for 25 years and is well known for his contributions in the fields of macroeconomic and regional economic policy. Donor: Professor T.N. Brewis. Endowed 1981.

Claude Brunelle Memorial Scholarship

Awarded annually on the recommendation of the Institute of Soviet and East European Studies to the student with the highest standing among those proceeding from the Third to the Fourth year of the undergraduate program. Donors: Family, friends and colleagues of the late Claude Brunelle, a former student of the Institute. Endowed 1985.

Donald William Buchanan Scholarship

Awarded annually for general competition among students entering Carleton University. Donor: The late Donald William Buchanan. Endowed 1967.

Bull Scholarship

Value \$1,000. Awarded annually, when merited, to a student or students for proficiency in Computer Science. Donor: Bull HN Information Systems Limited. Established 1979. Revised 1987, 1989.

Landen Dominic Burnett Memorial Award

Value \$300. Awarded annually to an outstanding student in Art History selected by the Chairman of the Department of Art History. Donor: The Vered Foundation. Established 1979.

Butterworths Prize in Law

A prize of \$250 and an additional \$100 in Butterworths' publications awarded annually, on the recommendation of the Department of Law, to a deserving student pursuing studies in law at Carleton. Donor: Butterworths & Co. (Canada), Limited. Established 1984.

D. Roy Campbell Scholarship

Awarded annually, under the terms of the will of the late D. Roy Campbell, for competition among students entering Carleton University with high standing in the senior matriculation examinations or the equivalent. Donor: The late D. Roy Campbell. Endowed 1962.

Henry Campbell Scholarships

Value \$2,300. Two scholarships awarded annually to full-time students entering or progressing from one year to the next at Carleton University. Provided from the estate of the late Edna Alice Campbell. Endowed 1978.

Canadian Association of Broadcasters Scholarships

Value \$500. Two scholarships are awarded annually to Honours year students in the Mass Communication program for the development and completion of an Honours Research Project. One will normally be granted for research in the area of radio; the other in the area of television. The recipients will be determined on the recommendation of a panel selected by the Associate Director (Mass Communication) of the School of Journalism in conjunction with the donor. Donor: Canadian Association of Broadcasters. Established 1987.

Canadian Society of Petroleum Geologists Undergraduate Student Award

An award, consisting of a certificate and one-year student membership in the Canadian Society of Petroleum Geologists, is given by the society on the recommendation of the Department of Earth Sciences, to an undergraduate student who has excelled in fields relating to petroleum geology. Established 1978.

Carleton Beaverbrook Awards for Freedom of the Press

Value \$300. Awarded annually, on the recommendation of the Chairman of the Department of History, to a student enrolled in a history course who submits the best essay that addresses the topic of freedom of the press and/or the right of access to the use of this medium by individuals and organizations. A case history method study will be favoured over a generalized essay. The award(s) will be provided from interest generated by The John Hanson Fund. Donor: J. Carlisle Hanson, Q.C. Endowed in 1982 in honour of John Hanson, a Canadian pioneer who, during his lifetime (1739-1820), established a settlement at Chamcook Island, New Brunswick.

Carleton University Academic Staff Association Scholarship

Value \$1,100. Awarded annually to a student of high proficiency proceeding from one year of program to another in undergraduate studies at Carleton University. Donor: Carleton University Academic Staff Association. Established 1977.

Carleton University Awards in English

Value \$1,000. Awarded annually to students from Ottawa area high schools. Prizes will be given in two categories. The writing award will be given for any one of the following: a play of at least 30 minutes running time; a sheaf of poems; a minimum of at least three short stories (no maximum); or a novel. The essay award will be given for an essay of a length to be determined annually by the Department. Candidates may contact the Carleton University Department of English for terms of the prizes, though information will be sent yearly to the English departments of all high schools in the area. In each category, the judges will award a first prize of \$200, a second prize of \$100 and four third prizes of \$50, unless they deem entries to be of insufficient calibre. Donor: Anonymous. Established 1981. Revised 1985.

Carling O'Keefe Scholarship

Value \$600. Awarded annually to an outstanding full-time student who is proceeding from one year of program to another at Carleton University. Donor: The O'Keefe Brewing Company Limited. Established 1972.

Carswell Company Book Award in Public Law

Value \$150. Awarded annually to a student with high standing in public law courses. Donor: The Carswell Company Limited. Established 1965. Revised 1987.

Victor S. Castledine Scholarship

Value \$500. Awarded annually to a student in Economics or Business who, in the opinion of the Chairman of the Department of Economics in counsel, has done outstanding work in the area of money, credit and banking studies. Donor: Victor S. Castledine, Esq. Endowed 1971.

CCH Canadian Limited Award in Taxation

A one-year's subscription to CCH's seven-volume Canadian Tax Reports awarded annually, on the recommendation of the Department of Law, to the student achieving the highest grades in tax law courses. Donor: CCH Canadian Limited. Established 1984.

Certified General Accountants Association of Ontario Award for Excellence

Value \$1,000. An annual award for excellence is given on the recommendation of the Director of the School of Business to a student graduating from Carleton University who has displayed outstanding achievement in accounting. The award is composed of a cash award of \$150 plus a credit of \$850 to be drawn down as and when the successful candidate wishes, for the purpose of defraying any fees related to courses in the CGA study program. The first drawdown on the credit must be made not later than 18 months after the date of notification to the successful candidate. Thereafter, the credit will be valid as long as the person is enrolled in the CGA program in Ontario. Donor: The Certified General Accountants Association of Ontario. Established 1981. Revised 1988.

Dr. John H. Chapman Memorial Prize in Communications Engineering

Value \$1,500. Awarded annually, on the recommendation of the Faculty of Engineering, to a student proceeding from Third to Fourth year who has demonstrated an interest in telecommunications and displays great promise in this field. This scholarship is provided by Spar Aerospace Limited in honour of Dr. John H. Chapman, who is widely regarded as the father of the Canadian space program. Established 1981. Revised 1985.

Society of Chemical Industry Award

A gold key with the crest of the Society of Chemical Industry in front and the name of the winner, course, year and university on back is granted to the student who has the highest standing in the final year of the Honours program in Chemistry. The winner will also receive a year's subscription to the journal, *Chemistry and Industry*. Donor: Canadian Section, Society of Chemical Industry. Established 1961.

Chemical Society of Canada Medal

Awarded annually to the student obtaining the highest academic standing in the penultimate year in the Honours Chemistry program. Established 1950. Revised 1983. 1985.

Chevron Canada Resources Limited Scholarship in Geology

Value \$1,000. Awarded annually to an outstanding undergraduate student who is entering the final year in Geology at Carleton University. Preference is given to a student who has displayed an indicated interest in the field of petroleum exploration. Donor: Chevron Standard Limited. Established 1980.

CHEZ-FM Research Award(s) in Mass Communication

Value \$600. Awarded annually to support the cost of Honours Research Project(s) in the Mass Communication program. The award(s) are given to project(s) on radio broadcasting and issues related to broadcast regulation generally. The recipient(s) are determined annually on the recommendation of a panel selected by the Associate Director (Mass Communication) of the School of Journalism in conjunction with the donor. Donor: CHEZ-FM Inc. Established 1984.

CHEZ-FM Research Award(s) in Sociology and Anthropology

Value \$600. Awarded annually to support the cost of media-related Honours Research Project(s) or Essay(s) in the Sociology and Anthropology program. The Award(s) are given to project(s) or essay(s) involving quantitative research on radio broadcasting, broadcast regulation generally, or quantitative research contributing to general theoretical development in media sociology. The recipient(s) are determined annually on the recommendation of a panel selected by the Director of the Department of Sociology and Anthropology, which includes a representative from CHEZ-FM Inc. donor: CHEZ-FM Inc. Established 1989.

Commonwealth Hospitality Ltd. Scholarship

Value \$250. Awarded annually to a student entering a full-time undergraduate program who has completed the Ontario Secondary School Honour Graduation Diploma (or its equivalent) and has demonstrated a high potential for university studies. Donor: Commonwealth Hospitality Ltd. Established 1975. Revised 1989.

Communications Law Prize

Awarded annually on the recommendation of a panel comprised of selected members of faculty who specialize in communications law, for excellence in the study of broadcast, press and telecommunications law. Donor: Leonard M. Bellam. Endowed 1983.

Duchess of Connaught Scholarship

The yield from the endowment of this historic scholarship has been made available to Carleton University by the Laurentian Chapter, I.O.D.E. The scholarship is to be awarded to an able student entering Carleton University, and may be held until graduation if merited, at which time a new award will be made. Donor: Laurentian Chapter I.O.D.E. Endowed at Carleton University 1960.

Naomi Cook Scholarship Fund

Value \$600. Awarded annually to students with high academic standing entering Carleton University. Donor: The late Naomi Cook. Endowed 1967.

Cooper Canada — George Lynn Design Award

Value \$1,500. Awarded annually to the Fourth-year Industrial Design student whose design research proposal is found most meritorious by the School. Established in memory of the late George A. Lynn, Associate Professor of Industrial Design, who, before his appointment to Carleton University, was Director of Design at Cooper Canada Limited. Donor: Cooper Canada Limited. Established 1985.

Michael Russell Coote Memorial Award

Awarded annually, on the recommendation of the Director of the School of Architecture, to a promising student who has successfully completed First year in the School of Architecture. Donors: Friends, family and colleagues of the late Michael R. Coote. Endowed 1983 in memory of Michael R. Coote, a member of the faculty since 1970 and Director of the School of Architecture from 1978 to 1982.

Jamie Corbet Memorial Award

Value \$550. Awarded annually, on the recommendation of the School of Computer Science, to an outstanding student who is proceeding from one year to another in the School of Computer Science. Donor: Friends and family of the late Jamie Corbet. Endowed 1981.

Jennie Shibley Cramm Scholarship

Value \$275. Awarded annually to a female student of high proficiency entering Carleton University from Nepean High School, Ottawa. Donor: The late Jennie Shibley Cramm. Endowed 1967.

W.H. Cramm Scholarship

Value \$275. Awarded annually to a male student of high proficiency entering Carleton University from Nepean High School, Ottawa. Donor: The late Jennie Shibley Cramm. Endowed 1967.

CSME Gold Medal

Awarded annually, on the recommendation of the Dean of Engineering, to a graduating student in the Mechanical Engineering program for outstanding achievement. Donor: The Canadian Society for Mechanical Engineering. Established 1988.

Catherine Daumery Memorial Award for Botanical Collection

Value \$50, together with a book prize. Awarded annually, if merited on the recommendation of the Department of Biology, to a student who has submitted by November 1, an outstanding collection of mounted and identified flowering plants. Donor: Anonymous. Established 1953.

Bertha F. Davis Award in Religion

Value \$400. Awarded annually to an outstanding student enrolled in the Pass or Honours program in the Department of Religion at Carleton University. Donor: Bertha Florence Davis. Endowed 1977.

W.R. Davis Engineering Scholarship

Value \$1,000. Awarded annually, on the recommendation of the Faculty of Engineering, to an outstanding student entering the Fourth year of the Electrical or Mechanical Engineering program. Donor: W.R. Davis Engineering Ltd. Established 1988.

Deloitte Haskins & Sells Award

An award (or awards) given on the recommendation of the Director of the School of Business for excellence in the study of accounting and/or finance. Donor: Partners of Deloitte Haskins & Sells. Endowed 1980. Revised 1986.

Jack Deutsch Memorial Masonry Award

Value \$500. Awarded every three years to the Carleton Architecture student who, in the past three years, has had the highest grade-point average in technical subjects (including the grade given for the application of technology in the Second-year studio design program). This award is given in rotation to the three schools in Ontario offering the Bachelor of Architecture degree. Donor: Ontario Masonry Contractors Association. Established 1983.

Digital Equipment of Canada Limited Award of Merit

Value \$250 and certificate. An award is given annually to the student who stands first in the course Engineering 94.303★, Real Time Computing Systems. Donor: Digital Equipment of Canada Limited. Established 1981.

Dobbie Regional Entrance Scholarship

Scholarships will be available for students entering Carleton University, to be divided equally among students from Ontario (except for the City of Ottawa), the Western provin-

ces and the Territories, and Quebec and the Atlantic provinces. Donor: The late Jemema Grace Dobbie. Endowed 1967.

Domtar Inc. Scholarship in Journalism

Value \$1,000. This scholarship is awarded annually, on the recommendation of the School of Journalism, to an outstanding student proceeding from Second to Third year in the Bachelor of Journalism program. Donor: Domtar Inc. Established 1985.

Lord Dundonald Chapter, I.O.D.E. Scholarship

Value \$200. Awarded annually to a student of superior standing and general proficiency, entering the final year of a degree program at Carleton University. Donor: Lord Dundonald Chapter, I.O.D.E. Established 1956.

A. Davidson Dunton Scholarships

These scholarships are named in honour of a former President of Carleton University and are awarded to outstanding students proceeding from one year to another of a full-time undergraduate program at Carleton. Established 1975. Revised 1985.

Dy-4 Systems Limited Entrance Scholarship

Value \$1,000. Awarded annually to a student who is entering the Bachelor of Computer Science program at Carleton from the Ontario Secondary School system and has demonstrated a high potential for university studies in computer science. Donor: Dy-4 Systems Limited. Established 1988.

Economics Essay Prize

Value \$500. Awarded annually, on the recommendation of the Chair of the Department of Economics, to an undergraduate student in the Economics program who has submitted an outstanding essay assignment at the 300 or 400 level. Donors: Class of '86. Established 1987.

Economics Scholarship

Value \$750. Awarded to the student or students entering the final year of the Honours program of studies, whose record of scholarship, in the opinion of the Department of Economics Scholarship Committee, merits special recognition. Established 1978.

Economics Society Award

Value \$100. Awarded annually, on the recommendation of the Chair of the Department of Economics, to the student proceeding from First to Second year of the Honours Economics program who stands first in the Introductory Economics course. Donor: Carleton University Economics Society. Established 1989.

Samuel L. Edelson Scholarship

Value \$250. Awarded annually to an outstanding student who is proceeding from one year of program to another at Carleton University. Donor: Members of the family. Established 1974.

Wilfrid Eggleston Award in Journalism

Value \$500. Awarded to the undergraduate with the best record in the Second-year Journalism Degree program. This award is named in honour of the late Dr. Wilfrid Eggleston, former Director of the School of Journalism. Donor: Anonymous. Established 1967.

Elizabeth's Award in Family Law

Value \$300. Awarded annually, on the recommendation of the Chair of the Department of Law, to the full-time undergraduate student standing highest in a course devoted to law of the family. Donor: V.M. Trudeau. Established 1989.

Dr. Reginald T. Elworthy Award in Chemistry

Awarded annually, on the recommendation of the Chair of the Department of Chemistry, to an outstanding student in Second year Physical Chemistry who is continuing in the Honours Chemistry program. Endowed 1987.

Engineering Institute of Canada Award

Awarded annually, on the recommendation of the Faculty of Engineering, to a Canadian citizen or permanent resident of high proficiency who is proceeding from First to Second year of the Engineering program. Donor: Ottawa Chapter of the Engineering Institute of Canada. Endowed 1989.

Enrichment Mini-Course Scholarship

Value \$500. Awarded annually, on the recommendation of the Director of the School of Continuing Education, to one or more students entering the First year of a program at Carleton University. Selection of the recipients will be based on the results of an annual competition for Enrichment Mini-Course students. Established 1990 to commemorate the 10th anniversary of the Carleton Enrichment Mini-Course program. Donor: School of Continuing Education.

Ernst & Young Award

Value \$100. Awarded annually to the student with the highest standing in the First year of the Business program. Donor: Ernst & Young, formerly Clarkson, Gordon & Company. Established in 1962. Revised 1989.

Bob Farquharson Memorial Award in Journalism

Value \$575. Awarded annually to an outstanding student enrolled in a full-time undergraduate program in the School of Journalism at Carleton University. Preference will be given to a Third-year student who has indicated an interest in pursuing a career in newspaper and magazine journalism. Donors: Canadian Managing Editors Conference and the Toronto Globe and Mail. Endowed 1980.

The Education Foundation of the Federation of Chinese Canadian Professionals of Ontario Entrance Scholarship

Annual entrance scholarship of \$750. Awarded to a student entering the First year of the School of Architecture. The award is based on academic achievement and financial need. Established 1987.

The Education Foundation of the Federation of Chinese Canadian Professionals of Ontario Scholarship

Annual award of \$250, in the School of Journalism, to an outstanding student in a course devoted to problems of the mass media. Established 1986.

The Education Foundation of the Federation of Chinese Canadian Professionals of Ontario Scholarship

Annual award of \$250, in the School of Architecture, to an outstanding student in a course devoted to energy and form and related workshop. Established 1986.

George Fierheller Scholarships

These scholarships are named in honour of a former Chairman of the Board of Governors of Carleton University and are awarded to outstanding students proceeding from one year to another of a full-time undergraduate program at Carleton. Established 1975. Revised 1985.

E. Alison Flood Award in Physical Chemistry

Awarded annually, on the recommendation of the Chair of the Department of Chemistry, to a student who shows promise in the area of physical chemistry. Preference will be given to an outstanding student in the Second year physical chemistry course who is proceeding to the Third year of a Science program. Donors: Friends and former students of the late Dr. E.A. Flood, a principal scientist at

the National Research Council, who in 1969 became a senior demonstrator in the Department of Chemistry. Endowed 1980. Revised 1988.

Lilian I. Found Award for Poetry

Value \$25. Offered annually for the best lyric of 50 lines or less submitted by an undergraduate of Carleton University by March 15. Details may be obtained from the Department of English. Donor: The late Mrs. Lilian I. Found. Endowed 1950.

Awards of the Embassy of France

For excellence in the study of French, two book awards are offered annually by the Embassy of France in Canada. Donor: Embassy of France. Established 1978.

Blair Fraser Memorial Award for Journalism Graduates

Value \$400. Offered annually to a Journalism student in his or her graduating year who, in the opinion of a board of selection, shows a marked aptitude for and interest in political reporting at the national and international level. Endowed 1969 in memory of Blair Fraser, Ottawa editor of *Maclean's Magazine*, by a group of his friends.

Jacob Freedman Scholarships

Awarded annually to outstanding students who are proceeding from one year of program to another at Carleton University. Donor: The late Jacob Freedman. Endowed 1967.

Department of French Scholarship

Value \$200. Awarded annually to an outstanding student entering Second or Third year in a Major or Honours program in French. Donors: Members of the Department of French. Established 1984.

Friends of Carleton Scholarships

Scholarships have been provided for general competition among students entering Carleton University at the senior matriculation level. Donor: The Friends of Carleton University. Established 1967.

GAC-MAC Undergraduate Scholarship in Earth Sciences

Awarded annually, on the recommendation of the Chair of the Department of Earth Sciences, to a deserving student who is proceeding from one year to another in the Honours Geology program. This scholarship was endowed in 1988 by the Geological Association of Canada and the Mineralogical Association of Canada in recognition of the support provided by undergraduate students when Carleton University hosted the "Ottawa 86" Annual Meeting.

Gandalf Scholarship

Value \$1000. Awarded annually, on the recommendation of the Dean of Engineering, to a Canadian citizen or permanent resident proceeding from Third to Fourth year of the Electrical Engineering program. Preference will be given to a student who has indicated an interest in data communication. Established 1987.

Awards of the Embassy of the Federal Republic of Germany

For excellence in the study of German, book awards are offered annually by the Embassy of the Federal Republic of Germany in Canada. Established 1955.

Clarence C. Gibson Scholarships

These scholarships are named in honour of a former Chairman of the Board of Governors of Carleton University and are awarded to outstanding students proceeding from one year to another of a full-time undergraduate program at Carleton. Established 1975. Revised 1985.

Glengarry Book Prize

Value \$100 gift certificate redeemable at the Carleton University Bookstore. Awarded annually by the Residence University Management and Policy Board to the residence student enrolled in full-time undergraduate studies who has achieved the highest grade-point average among residence students returning from the previous year, and who is not currently in receipt of another academic award from the University. Donor: Residence University Management and Policy Board. Endowed 1983.

Richard Glover Scholarship

Awarded annually, on the recommendation of the Department of History, to an outstanding student entering the Fourth year of the Honours History program. Endowed 1986.

David A. Golden Scholarships

These scholarships are named in honour of a former Chairman of the Board of Governors of Carleton University and are awarded to outstanding students proceeding from one year to another of a full-time undergraduate program at Carleton. Established 1975. Revised 1985.

Louis and Miriam Goldstein Book Award in Judaic Studies

Awarded annually to a deserving Carleton University student in Judaic studies, on the recommendation of the Department of Religion. Donors: Louis and Miriam Goldstein. Established in 1983 in honour of Carleton University's Fortieth Anniversary.

Mr. and Mrs. Louis L. Goldstein Book Award in Law

Awarded annually to a deserving Carleton University student in a Law program, on the recommendation of the Chairman of the department. Donors: Mr. and Mrs. Louis L. Goldstein. Established 1975.

Krishnakumar Gopalan Memorial Award

Awarded annually to the Fourth-year student standing highest in the Mechanical Engineering program. Established in memory of Krishnakumar Gopalan, the top graduating student of the class of 1985 in the Mechanical Engineering program, who lost his life tragically within days of graduation. Donor: Friends of the late Krishnakumar Gopalan. Endowed 1985.

Margaret Graham Award

Value \$200. Awarded annually to the undergraduate student with the best overall academic average proceeding from Third to Fourth year of the Bachelor of Journalism program. This award is named in honour of Margaret Graham, who was one of the founding members of the Canadian Women's Press Club in 1904. Donor: The Media Club (Ottawa Branch). Established 1977.

J. Lorne Gray Scholarships

These scholarships are named in honour of a former Chairman of the Board of Governors of Carleton University and are awarded to outstanding students proceeding from one year to another of a full-time undergraduate program at Carleton. Established 1975. Revised 1985.

Ian H. Griffith Memorial Scholarships

Value \$1,300. Awarded annually, if merited, to outstanding students proceeding from one year to another of a degree program in the Faculty of Science, preferably in the Integrated Science Studies program, and having some appreciation of the humanities. Donors: Mr. and Mrs. J. Griffith in memory of their son Ian H. Griffith, B.Sc., Carleton 1976.

Simon Guest Memorial Book Prize

Awarded annually, on the recommendation of the Chair of the Department of Earth Sciences, to a Fourth-year Honours Geology student. Endowed in 1988 by friends, family, the Geology Graduate Society and the Department of Earth Sciences in memory of Simon Guest, a Third-year geochemistry student who died tragically in the summer of 1988.

Peter Gerard Harris Memorial Award

Awarded annually on the recommendation of the School of Journalism to an outstanding student in the Third year of the Mass Communication program. Endowed 1985 by the family and friends of Peter G. Harris, a Carleton student who was named to the Deans' Honour List in June 1984, and who died tragically two months later.

Trevor A. Harwood Memorial Award

Awarded annually, on the recommendation of the Chair of the Department of Physics, to a promising student in need of assistance who is proceeding from one year to another in the combined Honours Geology and Physics program. Donor Anonymous. Endowed 1987.

Herbert G. Heron, Q.C. Award in Law

Value \$300. Awarded annually to a student in the Department of Law. Applicants and nominees for this award will be assessed by the Chairman of the Department of Law in conjunction with his or her committee. Established 1975 in memory of Herbert G. Heron, Q.C.

Gerhard Herzberg Scholarships

These scholarships are named in honour of a former Chancellor of Carleton University and are awarded to outstanding students proceeding from one year to another of a full-time undergraduate program at Carleton. Established 1975. Revised 1985.

Hewlett-Packard (Canada) Calculator Awards

A prize consisting of a programmable calculator, awarded to outstanding students entering their Second year in the Faculty of Engineering, the Faculty of Science and the School of Business. Donor: Hewlett-Packard (Canada) Ltd. Established 1984. Revised 1989.

E.P. (Ted) Hincks Memorial Scholarship in Physics

Awarded annually, on the recommendation of the Department of Physics, to a student showing high proficiency in Physics and proceeding from one year to another of a full-time undergraduate program in Physics or in Physics and an allied discipline. Established in 1984 in memory of the late Professor E.P. (Ted) Hincks, D.Sc. (Carleton), F.R.S.C., former Chairman of the Department of Physics and a pioneer in the area of high-energy physics.

E.P. Hincks Award of the Institute of Particle Physics

Value \$500. Awarded annually on the recommendation of the Department of Physics to an outstanding student in an Honours, Combined Honours, or Double Honours program in Physics at Carleton University. Donor: The Institute of Particle Physics. Established in 1984 in honour of the Institute's founding President, E.P. (Ted) Hincks, D.Sc., F.R.S.C. The late Professor Hincks played a seminal role in the development of high-energy physics in Canada and was a Chairman of the Department of Physics at Carleton University. Revised 1987.

J.M. Holmes Entrance Scholarship in Chemistry

Awarded annually on the recommendation of the Department of Chemistry to a student entering First-year Honours Chemistry. This award was endowed in 1986 to com-

memorate Professor Holmes' long association with high school and First-year students.

Professor James M. Holmes' Scholarship in Chemistry
Awarded annually to an outstanding student proceeding from the Second to the Third year of an Honours Chemistry program. Donors: Friends and former students of Professor James M. Holmes. Endowed 1984.

Janet M. Holmes Memorial Scholarship
Value \$300. Awarded annually, when merited, to a promising student proceeding from the Third to the Fourth year of the Honours Chemistry program at Carleton University. Candidates will be selected by the Department of Chemistry. Donors: Professor and Mrs. J.M. Holmes. Established July 1973.

C.V. Hotson Memorial Scholarship
Value \$500. Awarded annually to an undergraduate student who maintains high academic standing and is active in student affairs. Donated by Carleton alumni and other friends in memory of Mr. Hotson, a 1950 Carleton Journalism graduate and former member of the Students' Council who returned to Carleton in 1953 to become Administrative Assistant to the President, and Executive Secretary of the Alumni Association, a position he held until his death in October, 1960.

Sara Helen Parry Hughes Travel Award
Value \$2,000. Awarded at the discretion of the Department of Spanish to a good student taking the Department's Winter Programme Abroad, to assist with his or her travel cost. Given in memory of Sara Hughes, a gifted student in Spanish who was tragically killed in an accident at Gravenhurst, August 1984. The gift of her family and friends, 1984.

Award of the High Commission of India
For excellence in the study of Sanskrit, a book award is offered annually by the High Commission of India. Established 1976.

International House Award
Value \$115. Awarded to a student in his or her graduating year attending Carleton University on a student visa who, in addition to maintaining the academic levels of the degree program, has been an active participant in extracurricular activities in the University. Donor: International House. Endowed 1972.

Investigative Journalism Prize
Value \$1,500. Awarded annually for the best work by an undergraduate or graduate student which explores secrecy in the government or in the private sector, particularly as it restricts the flow of information to the public and the policy-making process in the areas of defence policy, the environment or health and safety. Students wishing to enter the competition should submit to the Director by June 1 each year work done in the previous 12 months which has been examined and graded in the School. The Director will appoint a committee of faculty to consider entries and select a winner. Donor: Muriel MacDonald B.J., Carleton University. Established 1988.

Allama Mohammad Iqbal Award
Value \$250. Awarded annually on the recommendation of the Department of Religion to an undergraduate student who has shown excellence in the field of Islamic studies. Donor: The Government of Pakistan. Endowed 1982.

Award of the Embassy of Italy
For excellence in the study of Italian, a book award is offered annually by the Embassy of Italy in Canada. Established 1971.

Mitch Jacobson Memorial Award in Photojournalism
Awarded annually to the student who, in the opinion of a selection committee appointed by the Director, is the best photojournalist in the School of Journalism. Donors: Friends of Mitch Jacobson. Established 1986.

Judith Johansen Memorial Award
Value \$260. Awarded annually on the recommendation of the School of Journalism to the Third-year Journalism student who submits the best series of interpretative reports during the academic year. Endowed in 1982 by friends, fellow students and teachers of Judith Johansen, B.J. 1970 and candidate for the degree of M.J.

Journalism Writing Style Book Award
Value \$50. Awarded annually as a book prize to a Journalism 28.220 student, the writing style of whose class assignments shows exceptional merit. Donor: Anonymous. Endowed 1970.

Dr. Harry Katznelson Memorial Scholarship
Value \$100. Awarded annually to an outstanding student proceeding into an advanced year in the Honours Biology program. Donors: Friends of the late Dr. Harry Katznelson, B.S.A., M.Sc., Ph.D., F.R.S.C., Director of the Microbiology Research Institute, Federal Department of Agriculture. Established 1965.

Kipling Award
Value \$500. Awarded annually, on the recommendation of the Dean of Engineering, to a student graduating from the Engineering program who has demonstrated leadership ability and service to the engineering profession and/or the University community. The recipient is to be a Canadian citizen or permanent resident of Canada. Donor: Camp 12 of the Ritual of the Calling of an Engineer. Established 1986.

Marston LaFrance Memorial Award in English
Value \$750. Awarded annually, if merited, on the recommendation of the Department of English to outstanding student(s) entering the Fourth year of the Honours English program at Carleton University. Endowed 1976 in memory of the late Dr. Marston LaFrance, former Dean of the Faculty of Arts, Division I.

Charles Lazarus Scholarship
Awarded annually on the recommendation of the School of Journalism to a First-year Journalism student showing all-round academic excellence. Endowed in 1985 by the family of Charles Lazarus, in his honour.

Abraham and Dora Lithwick Prize
Value \$50. Awarded annually for ten years to a hand-capped student at Carleton University. Donor: Mrs. Dora Lithwick. Endowed 1981.

Harold Lithwick Memorial Scholarship
Value \$300. Awarded annually to a disabled student enrolled in a program at Carleton, who has completed at least three credits towards a degree. Donor: Mrs. Sarah Lithwick Green. Established 1982.

Donald G. Loughheed Memorial Scholarship
Value \$2,500. Awarded annually on the recommendation of the Faculty of Engineering to an outstanding student proceeding from one year to another of a full-time undergraduate program in Engineering. Donor: Leigh Instruments. Established 1985.

Francis C.C. Lynch Scholarships
Scholarships have been established for open competition among students entering or proceeding from one year to

another in Arts, Social Sciences, Science, Business, Journalism, Engineering or Architecture. Donor: The late Francis C.C. Lynch. Endowed 1967.

George A. Lynn Memorial Scholarship

Awarded annually on the recommendation of a jury appointed by the Director of the School of Industrial Design, for excellence in the design of medical equipment. Donors: The friends and family of the late George A. Lynn. Professor Lynn was a well known Canadian industrial designer who, as one of the first Professors of Industrial Design, was a member of the faculty from 1975 until his untimely death in 1983. Endowed 1984.

David Carton MacDonald Memorial Award

Value \$300. Awarded annually, on the recommendation of the Chairman of the Department of English Language and Literature, to the student with highest standing in the graduating class in Honours English who has a special interest in modern literature. Established 1987 in memory of David Carton MacDonald.

Macdonald Club Awards in Music

Value \$500 each. Awarded annually on the recommendation of the Department of Music to two outstanding students in the Pass or Honours program in Music who have demonstrated a special interest in the creative arts. Donor: The Macdonald Club, a private club created to support and encourage the creative arts. Established 1981. Revised 1989.

Macedonian Association of Ottawa Scholarship in Greek Studies

Value \$300. Awarded annually, when merited, on the recommendation of the Department of Classics to a continuing student of Classical Greek language or civilization who has completed at least one course in the field. Candidates should consult the Department of Classics for precise details of the scholarship's terms. Donor: Macedonian Association of Ottawa. Established 1987.

Gavin Scott Macfarlane Memorial Scholarship

Value \$750. Awarded annually to an outstanding student, preferably in Honours, who is proceeding from one year of program to another at Carleton University. First donated in 1957 by Mrs. G.S. Macfarlane in memory of her husband, Lieutenant-Colonel Gavin Scott Macfarlane.

R.A. MacKay Award in Political Science

Value \$250. Awarded annually by the Department of Political Science to a student in good standing in accordance with terms that the Department may from time to time establish. Donor: The late Dr. R.A. MacKay. Endowed 1977.

Chalmers Jack Mackenzie Scholarships

These scholarships are named in honour of a former Chancellor of Carleton University and are awarded to outstanding students proceeding from one year to another of a full-time undergraduate program at Carleton. Established 1975. Revised 1985.

Murdoch Maxwell MacOdrum Scholarships

These scholarships are named in honour of a former President of Carleton University and are awarded to outstanding students proceeding from one year to another of a full-time undergraduate program at Carleton. Established 1975. Revised 1985.

Manufacturers Life Scholarship in Business

Value \$1,000. Awarded annually to an outstanding student entering the Bachelor of Commerce program at Carleton

University. Donor: The Manufacturers Life Insurance Co. Established 1976.

Department of Mathematics and Statistics Entrance Award

Value \$500. One or more annual awards for a student or students entering the First year of an Honours or Major program in the Department of Mathematics and Statistics at Carleton University. The selection of the recipient or recipients will be based on the results of an annual Competition for High School students, with the decision being recommended by the Chairman of the Department in consultation with the Director of Student Awards and the Department's High School Liaison Committee. Donors: Members of the faculty in the Department of Mathematics and Statistics. Established 1973.

Roderick C. McDonald Memorial Scholarship in Engineering

Value \$300. Awarded annually to an Engineering student of high proficiency entering the Fourth year of program. Established by the University in memory of the late Roderick C. McDonald who, before his death in 1961, was a member of the Faculty of Engineering.

R.L. McDougall Award in English

Awarded annually to an outstanding student in the Pass or Honours program in English. This award was established by friends, family and colleagues of Rob McDougall in recognition of his 25 years of service as a distinguished member of the Department of English and especially for his contribution as teacher, scholar and administrator in the field of Canadian studies. Endowed 1983.

McGregor Easson Scholarship

Awarded annually, to an outstanding student proceeding from one year to another of a full-time undergraduate program in the Arts or Social Sciences. Donor: The late Leah Easson. Endowed 1989.

D.F. McKechnie Award in Accounting

A book prize awarded, when merited, to a student in Business for proficiency in the study of accounting. Donor: D.F. McKechnie, C.A. Endowed 1951.

Violet McLaughlin Scholarship

Awarded annually to students entering or proceeding from one year to another at Carleton University. This fund was given by the late Violet McLaughlin, a resident of Ottawa, in memory of St. Patrick's College. Endowed 1984.

McNaughton Scholarship

The sum equal to tuition fees is awarded annually to a student entering the Fourth year of the Engineering program who has demonstrated a previous commitment to the McNaughton Centre and related IEEE activities. Established in honour of the late General Andrew G.L. McNaughton, scientist, soldier, politician, diplomat, and the inventor of the cathode-ray direction finder. The selection of the recipient will be made by the Faculty of Engineering. Donor: International Electrical, Electronics Conference (IEEC), Inc. Established 1985. Revised 1989.

Dr. Frederick William Charles Mohr Scholarships

Scholarships have been made available for annual competition among students entering Carleton University or proceeding from one year of program to another and who come from communities within the following Ontario and Quebec counties: Ontario: Renfrew, Russell, Prescott, Glengarry, Stormont, Dundas, Grenville, Carleton, Lanark, Nipissing, Leeds; Quebec: Pontiac, Gatineau, Hull, Papineau, Argenteuil, Temiskaming. These awards are

provided through the bequest of the late Dr. F.W.C. Mohr. Donor: The Frederick W.C. Mohr Estate. Endowed 1963.

Music Department Award

For the encouragement of a student displaying early excellence in music studies, an award is offered annually to the student registered in the B.A. (Music) or B.Mus. program displaying the best performance in the first three required music courses, excluding Music 30.195★. Donor: Anonymous. Endowed 1983.

Jayashree A. Nagpur Memorial Award

Value \$50. Awarded annually on the recommendation of the Department of English to an outstanding student in the English program at Carleton University. Donor: Anant L. Nagpur. Established 1976.

National Council of Jewish Women of Canada Award

Value \$100. Awarded on the recommendation of the Department of Religion to a student achieving high standing in the area of Judaic studies. Donor: National Council of Jewish Women of Canada, Ottawa Section. Established 1973.

Betty Nesbitt Memorial Award in Biology

Value \$775. Awarded annually to a student entering the Third year of a Bachelor's Degree program in Biology, who, in the opinion of the Department has shown exceptional promise in the field of biology. Preference will be given to a student in a faculty other than the Faculty of Science. Donors: Friends of the late Mrs. H.H.J. Nesbitt. Endowed 1976.

H.H.J. Nesbitt Scholarship in Biology

Value \$150. Awarded annually to an outstanding student proceeding from the Third to Fourth year of the Honours program in Biology at Carleton University. Established 1951, in memory of Mr. and Mrs. T.E. Clendinnen, by their daughter.

James Nolan Memorial Award

Value \$825. Awarded annually to a student in Business, for proficiency in the study of accounting. Donors: The family and friends of the late James P. Nolan, B.Com. Carleton 1977. Endowed 1977.

F.K. North Award in Geology

A book is awarded annually, on the basis of outstanding performance, to a student in final year of the Honours Geology program at Carleton University. This award was provided by friends and colleagues of Ken North, in recognition of his 19 years of service as a renowned teacher of geology at Carleton University, and in particular recognition of his timely and articulate statements that led to careful re-evaluation of Canada's petroleum reserves. Donors: Friends and colleagues of Dr. North. Endowed 1981.

Frederick C. Nossal Award in Journalism

Value \$1,500. Awarded annually to the student graduating from the Bachelor of Journalism program with the best academic record over the entire program. This award is provided in honour of Frederick C. Nossal who, as a foreign correspondent for The Globe and Mail, established its Far Eastern Bureau in Peking in 1959. Donors: The children of Frederick C. Nossal: Kim, Nicole, Michelle and Shane Nossal. Established 1984. Revised 1987.

Michael Oliver Scholarships

These scholarships are named in honour of a former President of Carleton University and are awarded to outstanding students proceeding from one year to another of a full-time undergraduate program at Carleton. Established 1975. Revised 1985.

Ontario Association of Architects Awards

Value \$2,400. Awarded annually to a deserving student enrolled in the Second year of the School of Architecture program an award of \$1,200; and to a deserving student enrolled in the Third year of the School of Architecture program an award of \$1,200. Donor: Ontario Association of Architects. Established 1972.

Ontario Hydro Electronics Engineering Award

Value \$1,700. Awarded annually, when merited, on the recommendation of the Chair of the Department of Electronics, to a student proceeding from Second to Third year of the Engineering program who is specializing in Electronics. Donor: Ontario Hydro. Established 1986. Revised 1987, 1988.

Bettina Oppenheimer Memorial Scholarship in Music

Value \$1,000. Awarded annually on the recommendation of the Department of Music to an academically outstanding student within six credits of completion of the Bachelor of Music degree. Donor: E.M. Oppenheimer. Endowed 1982.

Ordine Italo-Canadese Scholarship

Value \$500. Awarded annually, on the recommendation of the Department of Italian, to a Canadian citizen or permanent resident who is proceeding from one year to another in a full-time program in Italian (Pass or Honours) and who has shown high proficiency and interest in the study of Italian. Donor: Ordine Italo-Canadese. Established 1988.

Robert E. Osborne Award

Awarded annually, on the recommendation of the Chair of the Department of Religion, to an undergraduate or graduate student in the Religion program. Preference, in order, will be given in the areas of New Testament, Biblical and other forms of religious studies. Endowed 1986 in memory of Robert E. Osborne, who was a professor in the Department of Religion.

City of Ottawa Scholarship for Disabled Persons

Value \$1,000. Awarded annually to a disabled student entering or enrolled in a full-time program of studies at Algonquin College of Applied Arts and Technology, Carleton University or the University of Ottawa. The award may be continued for up to four years, provided the candidate maintains satisfactory academic standing. Applicants for the scholarship must be disabled, according to the United Nations definition. Priority shall be given first to students of academic merit and second, for financial need. Donor: City of Ottawa. Established 1981.

Ottawa Citizen Scholarship

A scholarship valued at \$2,400 awarded annually, if merited, to a student entering Carleton University from a high school in any one of the following counties in the Ottawa district: nine in Ontario (Carleton, Dundas, Glengarry, Grenville, Lanark, Prescott, Renfrew, Russell and Stormont) and four in Quebec (Gatineau, Hull, Papineau and Pontiac). A student admitted with senior matriculation standing will receive \$800 per year for a period of three years, always provided that the student is registered as a regular full-time student at Carleton University and maintains a satisfactory academic standing. Donor: The Ottawa Citizen. Established 1955.

Ottawa Citizen Scholarship in Journalism

Maximum value \$2,400. Awarded annually to a student entering First year of Journalism. The winner will receive \$600 a year until graduation provided the student is registered as a full-time student at Carleton University and maintains a satisfactory academic standing in the Jour-

nalism program. Donor: The Ottawa Citizen. Established 1969.

Ottawa Construction Association Award

Value \$500. Awarded annually on the recommendation of the Department of Civil Engineering to a student (or students) with outstanding performance in construction management. Donors: Ottawa Construction Association. Established 1985.

Ottawa Hydro Entrance Scholarships

Value \$1000. Two scholarships are awarded annually, one to a student entering the Electrical Engineering program and one to a student entering the Computer Science program from an Ottawa or Vanier High School. Established in 1990 to commemorate the 75th anniversary of Ottawa Hydro. Donor: Ottawa Hydro.

Ottawa Ladies' College Scholarships

Provided for annual competition among undergraduates for the various disciplines. Endowed 1967.

Ottawa Muslim Women's Auxiliary Award

A book is awarded annually on the recommendation of the Department of Religion to a student achieving high standing in the area of Islamic studies. Donor: The Ottawa Muslim Women's Auxiliary. Established 1981.

Ottawa Women's Canadian Club Scholarship

Awarded to an outstanding student who is a Canadian citizen proceeding from one year of program to another of the undergraduate Canadian Studies program. Endowed 1946. Revised 1977, 1983.

Oxford University Press Award in Law

A prize of a copy of the *Oxford Companion to Law* awarded annually, on the recommendation of the Department of Law, to a deserving student pursuing the study of law at Carleton. Donor: Oxford University Press. Established 1984.

The Page and Steele School of Architecture Scholarship

Value \$300. Awarded annually to an outstanding student enrolled in the School of Architecture at Carleton University. Donor: Page and Steele Architects. Established 1967.

Dr. C. Stewart Parsons Scholarship in Engineering

Awarded annually to an entering or continuing student in the Faculty of Engineering. Endowed 1984 by Mrs. C.S. Parsons in memory of her husband, a former Director of the Bureau of Mines.

Charles and Helen Pattenson Scholarships

Awarded annually to students entering Carleton University who have demonstrated a high potential for university studies. Mr. Pattenson was engaged in engineering research and development in the Radio and Electrical Engineering Laboratories of the National Research Council, Ottawa, Canada, from 1940 to his retirement in 1976. Donors: The late Charles F. and Helen M. Pattenson. Endowed 1980.

Lester Bowles Pearson Scholarships

These scholarships are named in honour of a former Chancellor of Carleton University and are awarded to outstanding students proceeding from one year to another of a full-time undergraduate program at Carleton. Established 1975. Revised 1985.

Ottawa Section of the Petroleum Society of CIM Annual Award

Value \$500. Awarded annually, when merited, on the recommendation of the Chairman of the Department of

Earth Sciences, to a Canadian citizen or permanent resident proceeding to the Third or Fourth year of a degree program in Science or Engineering. Preference will be given to a student who has demonstrated an interest in the petroleum industry. Donor: Ottawa Section of the Petroleum Society of CIM (a constituent Society of the Canadian Institute of Mining and Metallurgy). Established 1987.

Charles Pinhey Award

Awarded to a student entering the First year of Business at Carleton University from a secondary school in the Regional Municipality of Ottawa-Carleton. The sum of \$300 will be awarded in the student's First year, and \$200 for each succeeding year provided the student is registered as a full-time student at Carleton University and maintains scholarship levels in the Business program. This award is based on high academic performance and on financial need. Donor: The Ottawa-Carleton Board of Trade. Established 1974.

Prince Memorial Achievement Award

A book award valued at \$100. Awarded annually to an outstanding graduating Honours student in Economics. The student will be selected on the recommendation of the Award Committee of the Department of Economics. Book(s) will be selected by the Department in consultation with the recipient. Endowed 1984 by Professor Kanta Marwah.

James H. Rattray Memorial Scholarship

Value \$500. Awarded annually to a student entering First-year Engineering at Carleton University. Donor: The late James H. Rattray, M.C. Endowed 1961.

Peter Reilly Scholarship

Value \$750. Awarded annually to a student entering either the Third or Fourth year of a degree program in the School of Journalism who shows talent, aptitude and concern for journalistic disciplines. Preference will be given to a student entering Fourth year who has demonstrated a potential for effective use of the medium of television, current affairs and/or documentary programs. Donors: Friends of the late Peter Reilly. Endowed 1978.

Rolls-Royce Scholarship

Value \$1,500. Awarded annually, on the recommendation of the Faculty of Engineering, to a student proceeding from Third to Fourth year of the Engineering program who has demonstrated an interest in aerospace engineering and displays great promise in this field. Donor: Rolls-Royce Industries Canada Inc. Established 1988.

Herman and Zelda Roodman Award in Journalism

Value \$200. Awarded annually for excellence in reporting to a Second- or Third-year student in the School of Journalism. Donors: Mr. and Mrs. Herman S. Roodman. Established 1965. Revised 1980, 1988.

R.L. Rosenberg Memorial Scholarship in Mathematics

A scholarship awarded on the recommendation of the Department of Mathematics and Statistics to an outstanding student entering a First-year Honours program in the Department of Mathematics and Statistics at Carleton University. Endowed in 1986 by the daughters, friends and academic colleagues of the late Reuben L. Rosenberg, who served this University and his Department, with distinction.

Barbie Ross Memorial Award

Value \$500. Awarded annually on the recommendation of the Residence University Management and Policy Board to a full-time student in good academic standing who has

demonstrated active participation in the affairs of the Carleton University residence community. Donors: Friends and family of the late Barbie Ross. Endowed 1983.

Annie Fraser Roy Scholarships

Awarded annually to an in-course student or students enrolled in a program, the majority of whose courses are in literature. Donor: The late Marjorie T. Roy. Endowed 1982.

James and Jane Fraser Roy Scholarships

Awarded annually, if merited, to outstanding students proceeding from one year to another in a degree program at Carleton University. Donor: The late Jean Roy. Endowed 1975.

J. Lansing Rudd Scholarship

Awarded annually to a superior student progressing from one year of program to another at Carleton University. Donor: The late J. Lansing Rudd. Endowed 1967.

Department of Russian Undergraduate Award

Awarded annually on the recommendation of the Department of Russian to an outstanding undergraduate student pursuing a Pass or Honours degree in the Department of Russian. Donors: Members and friends of the Department of Russian. Endowed 1983.

Celia Ruygrok Memorial Scholarship

Awarded annually on the recommendation of the Dean of Social Sciences to a deserving student proceeding from Second to Third year of the Criminology and Criminal Justice Concentration. Endowed in 1986 by family and friends of the late Celia Ruygrok, B.A. 1985.

Jacques and Hélène Sabourin Memorial Scholarship

Awarded annually, on the recommendation of the Director of the School of Architecture, to the student showing the greatest proficiency in a course devoted to lighting for architecture. Donated by the Illuminating Engineering Society and its members in memory of Jacques and Hélène Sabourin who were active in the field of illumination and who tragically lost their lives in an automobile accident in 1984. Endowed 1985.

St. Patrick's College Scholarship

Awarded annually to an entrance or in-course student or students in the humanities and social sciences, with preference being given to students with physical disabilities. Endowed in 1980 to perpetuate the name and traditions of St. Patrick's College.

Samuel Sair Canadian Jewish History Prize

Awarded annually, if merited, on the recommendation of the Department of History to a student submitting the best History term paper, research essay or thesis on any aspect of Jewish history in Canada that uses in part the archival holdings of the Public Archives of Canada. Endowed 1985.

Lawrence Segal Memorial Fund

Established as a book prize for a student enrolled in the School of Business. Donors: The friends of the late Lawrence J. Segal, B.Com. Carleton, 1961. Endowed 1970. Revised 1986.

Richard J. Semple Memorial Award in Mathematics

Value \$600. Awarded annually to an outstanding student enrolled in an Honours Mathematics program and proceeding to Third or Fourth year of studies at Carleton University. Donors: Friends and family of the late Richard J. Semple. Endowed 1977 in memory of Richard J. Semple, a long-time faculty member of the Department of Mathematics.

Eric Sigurdson Award

Value \$650. Awarded annually to an outstanding student in the Computer Systems Engineering program. Donors: Friends and colleagues of the late Professor Eric L. Sigurdson, former member of the Department of Systems and Computer Engineering, in recognition of his contributions to teaching, research and development, and to the establishment of the Computer Systems Engineering program. Endowed 1982.

Kenneth F. Smith Memorial Award in Journalism

Awarded annually, on the recommendation of the School of Journalism, to the First-year student standing highest in the Honours Journalism program. Donated by relatives, friends and business associates in honour of the late Kenneth Smith, a Carleton Journalism graduate who became a noted business writer and editor with the Canadian Press. Endowed 1985.

Richard R. Snell Memorial Award in Journalism

Awarded annually, on the recommendation of the School of Journalism, to an outstanding student in the Journalism program who shows exceptional abilities in investigative reporting. Donated by friends and relatives in honour of Richard R. Snell, a Carleton Journalism graduate and Southam Fellow, who following a notable newspaper career became a leader in the field of public sector communications. Endowed 1988.

Hyman Soloway Scholarships

These scholarships are named in honour of a former Chairman of the Board of Governors of Carleton University and are awarded to outstanding students proceeding from one year to another of a full-time undergraduate program at Carleton. Established 1975. Revised 1985.

Harry H. Southam Scholarships

These scholarships are named in honour of a former Chancellor of Carleton University and are awarded to outstanding students proceeding from one year to another of a full-time undergraduate program at Carleton. Established 1975. Revised 1985.

Mercy Neal Southam Entrance Scholarships

Entrance scholarships will be awarded annually, if merited, to students entering the First year of Arts, Social Sciences, Journalism, Commerce, Science, Engineering, Architecture, Industrial Design or Public Administration at Carleton University. Endowed in 1949. Under the terms of bequest of the late Wilson Mills Southam, the scholarships are in memory of his grandmother, Mercy Neal Southam (1809-1887), "Sturdy pioneer of the Southam Family in Canada."

Award of the Embassy of Spain

For excellence in the study of Spanish, a book award is offered annually by the Spanish Embassy in Canada. Established 1960.

E.W.R. Steacie Scholarships

These scholarships are named in honour of a former Chairman of the Board of Governors of Carleton University and are awarded to outstanding students proceeding from one year to another of a full-time undergraduate program at Carleton. Established 1975. Revised 1985.

Ben and Mary Steinberg Foundation Scholarships

Awarded to outstanding students who may be in need of financial assistance in the furtherance of their studies. Established 1978.

Harry Stevinson Scholarship in Aeronautical Engineering
Value \$1,000. Awarded annually on the recommendation of the Chairman of the Department of Mechanical and Aeronautical Engineering to a student enrolled in aeronautical engineering at Carleton University. Donor: Leigh Instruments Limited. Established 1980.

Irene Gertrude Stitt Scholarship Fund

Awarded annually to students of high proficiency proceeding from one year of program to another at Carleton University. The fund has been made possible by a bequest of the late Edith May Stitt, in memory of her sister, Irene G. Stitt. Endowed 1966.

Barbara Sudall Book Prize

Awarded annually on the recommendation of the Department of English to an outstanding part-time student in the Pass or Honours program in English. Endowed 1986 by friends and colleagues of Barbara Sudall in recognition of her twenty-two years of service as the Faculty Administrator in the Faculty of Arts.

Awards of the Ambassador of Switzerland to Canada

For excellence in the study of French, German, and Italian, book awards are offered annually by the Ambassador of Switzerland to Canada. Established 1953.

Thomson Award for Reporting

Value \$300. Awarded annually to a student proceeding from Third- to Fourth-year Honours Journalism judged to be outstanding in reporting. Donor: Thomson Newspapers. Established 1970.

Thorne Ernst & Whinney Scholarships

Two scholarships valued at \$825 each. Awarded annually to the Third year Business students standing highest and second highest in the Commerce program. Donor: Thorne Ernst & Whinney. Established 1969. Revised 1987, 1988.

Henry Marshall Tory Award

Presented annually to an outstanding graduating student who has shown a high degree of academic application, has indicated an interest in the University by broad participation in extracurricular activities of a constructive nature, has indicated qualities of leadership, and has attended Carleton University for at least three Fall/Winter sessions. Each candidate is nominated by three members of the Students' Association and selection is made by a committee composed of the President of the University, a member of the Faculty chosen by Senate, the Director of Student Awards, and three students chosen by the Students' Council. The winner's name is inscribed on the master trophy and the student receives a miniature replica. The award was established in 1950 by the Students' Council of Carleton College.

Henry Marshall Tory Scholarships

These scholarships are named in honour of the first President of Carleton University and are awarded to outstanding students proceeding from one year to another of a full-time undergraduate program at Carleton. Established 1975. Revised 1985.

Touche, Ross & Company Scholarships

Two scholarships valued at \$250 each. Awarded to a student who is proceeding from one year to another in the degree program in Business, and who intends upon graduation to study for the qualification of chartered accountant. The award will be made to the student whose character, ability, academic records and other qualities are, in the opinion of the School of Business, those needed by a chartered accountant. Preference will be given to a student with these qualifications who will be entering the final year

of program. Applications should be submitted to the Chairman of the School of Business before March 1. Donor: Touche, Ross & Company. Established 1962.

Hubert Travers Scholarship

Awarded annually to outstanding students entering or proceeding from one year to another of a full-time undergraduate program at Carleton University. Preference shall be given to students from the Ottawa area. Endowed 1983.

Underhill Prize

Value \$200. Awarded annually, on the recommendation of the Department of History, to the graduating student with the highest overall grade-point average in the Honours History program. Endowed 1986.

Awards of the Embassy of the Union of Soviet Socialist Republics

For excellence in the study of Russian, awards are offered annually by the Embassy of the Union of Soviet Socialist Republics. Established 1963.

University Women's Club of Ottawa Scholarships

Three scholarships valued at \$500 each. Awarded annually to women students at Carleton University continuing in undergraduate studies who have completed the equivalent of at least five credits beyond entrance requirements at the University and have demonstrated a high potential for university studies. To be eligible, the candidate must have maintained a high academic standing and be registered as a part-time student. Donor: University Women's Club of Ottawa. First established in 1952 in honour of Dr. Alice E. Wilson. Revised 1989.

Vered Foundation Scholarships

Two scholarships valued at \$500 each; one awarded annually, if merited, to an Engineering student in Civil Engineering; the second scholarship awarded annually, if merited, to a student who is proceeding from one year of course to another in a degree program in Political Science. Donor: The Vered Foundation of Ottawa. Established 1975.

L.N. Wadlin Scholarship in Mathematics

Value \$550. Awarded annually to a student proceeding from one year to another at Carleton University who has shown excellence in the study of mathematics. Donor: The late Lorenzo N. Wadlin. Endowed 1965.

Wainwright Scholarships

Awarded annually to a student or students studying Canadian history. Donor: Miss Dora I.I.S. Wainwright. Endowed 1974. Revised 1980.

Jessie and Wreford Watson Award in Geography

Value \$250. Awarded annually to the outstanding student entering the final year of Honours Geography at Carleton University. Dr. Wreford Watson, then Chief Geographer of Canada, founded geography at Carleton in 1949. One year later he was joined by Mrs. Watson and together they lectured in geography at Carleton until 1954. Donors: Friends, faculty and alumni of the Department of Geography. Endowed 1980.

R.A. Wendt Book Prize

Value: \$200. Awarded on the recommendation of the Department of Psychology, preference will be given to a student in an undergraduate degree program for work done in the history of psychology. This fund was established on the occasion of Professor Wendt's retirement, in recognition of his contributions over many years to the Department of Psychology, the Faculty of Social Sciences, and to the University community. This prize is intended to assist the recipient to build a personal library.

Elizabeth White Memorial Award for Zoological Collection
Value \$50, together with a book prize. Awarded annually, if merited, on the recommendation of the Department of Biology to a student who has submitted, by November 1, an outstanding collection of insects or arachnids, properly preserved and identified. Donor: Anonymous. Established 1953.

Wilgar Memorial Award in English

A book prize awarded to a Carleton University undergraduate who has shown excellence in essay-writing. Established 1951, in memory of the late W.P. Wilgar, Assistant Professor of English at Carleton University, 1948-50. Endowed 1952.

Goldie Wilkinson Scholarship

Awarded annually, on the recommendation of the School of Computer Science, to an outstanding student proceeding from First to Second year of the Bachelor of Computer Science program. Donors: Friends and colleagues of Goldie Wilkinson, a long time member of the University community, in recognition of her special interest in, and support of, students. Endowed 1988.

Kenneth R. Wilson Memorial Award for Journalism Graduates

Value \$900. Offered annually to a student graduating in Journalism who, in the opinion of a board of selection, shows exceptional promise as a future reporter and interpreter of Canadian affairs. Endowed 1953, in memory of Kenneth R. Wilson, Ottawa Editor of *The Financial Post*, by a group of his personal friends.

Morley E. Wilson Scholarship

Awarded annually to an outstanding student in Honours Geology who is proceeding from one year of program to another at Carleton University. Donor: The late M.E. Wilson, Sessional Lecturer in Geology at Carleton University, 1947-1953. Endowed 1975.

Phyllis Wilson Award in Journalism

Value to be announced. Awarded annually to the top student in Second-year reporting. The recipient is selected by the faculty members of the School of Journalism on the basis of recommendations from the Second-year reporting instructors. Donors: Friends and former students of Professor Phyllis Wilson. Endowed 1982.

Herbert I. Wolf Award

Value \$100. Awarded annually to an undergraduate student enrolled in a full-time program at Carleton University. The award is given in memory of Herbert I. Wolf, the son of the donor, who died in active service. Donor: George M. Wolf. Endowed 1981.

Helga A.M. Wolff Memorial Scholarship in Latin

Value \$350. Awarded annually, on the recommendation of the Chair of the Department of Classics, to the student with the highest standing among those proceeding from one year to another of the Pass or Honours Latin program. Donor: Emin A. Niazi. Established 1989.

Women's Business Network Association of Ottawa Scholarship

Awarded annually, on the recommendation of the Director of the School of Business, to a Canadian citizen or permanent resident proceeding from one year to another of a full-time undergraduate program, and who has shown high proficiency in a course devoted to entrepreneurship. Donor: Women's Business Network Association of Ottawa, an association created to promote, improve and profile women in business. Established 1987.

Gordon J. Wood Scholarships in English

Value \$350 each. One to a full-time student in English proceeding from Second to Third year, who has taken at least three credits in English at Carleton; one to a full-time student in English proceeding from Third to Fourth year, who has taken at least four credits in English at Carleton University. The assessment is made on the basis of overall grades for the year, including Summer courses (if any) from the previous Summer. English marks will be given particular consideration if necessary in the ranking of qualifying students. Donor: Gordon J. Wood, Professor of English, Carleton University. Established 1974.

Susan Joan Wood Memorial Scholarship

Value \$850. Awarded annually on the recommendation of the Department of English. Preference will be given to a student proceeding from the Third to Fourth year of an Honours program in English with an emphasis on Canadian literature. Donor: Friends and colleagues of Susan Joan Wood. Endowed 1982.

Hume Wrong Scholarship

Established by Mrs. Hume Wrong in memory of her late husband. Awarded annually to the leading student in the Third year of History or Political Science proceeding to his or her final Honours year. Donor: The late Mrs. Hume Wrong. Endowed 1962.

Nathan and Sara Zelikovitz Award

Value \$55. Awarded to an outstanding undergraduate student registered in a full-time program at Carleton University. Donor: Nathan Zelikovitz. Endowed 1979.

Bursaries

Evelyn Aldridge Bursary in Economics

Awarded annually to a deserving and needy student or students in any year of Pass or Honours studies in the Department of Economics at Carleton University. Endowed in 1980 in honour of Evelyn Aldridge, Department Secretary and Administrator, in recognition of 20 years of devoted service to the University and to the Department of Economics, its faculty and students. Donors: Members and graduates of the Department of Economics and friends of Mrs. Aldridge.

A. Andras Memorial Bursary

Awarded annually to an undergraduate student attending Carleton University who is in need of financial assistance and whose parent is a member of a trade union that is affiliated to the Canadian Labor Congress. Endowed 1972, in memory of the late Mr. A. Andras who was a member of Carleton's Board of Governors.

Atkinson Charitable Foundation Bursary Fund

Awarded to assist students of Carleton University. Terms of award are as follows: (1) In addition to scholastic merit and financial need, goal and promise will be considered in selecting recipients. (2) Candidates must be residents of Ontario. (3) An applicant must have completed at least one academic year and be enrolled as a full-time undergraduate in any program at Carleton University. (4) For one of the awards, preference will be given to candidates intending later to pursue studies in theology. Donor: The Atkinson Charitable Foundation. Offered for the first time in 1951, as an experiment in the provision of financial aid to students.

F. Luella Barrigar Bursaries

Awarded annually to students entering Carleton University or proceeding from one year of program to another who are

in financial need. Some preference shall be given to students with an interest in music. The bursaries are provided through the bequest of the late Miss F. Luella Barrigar, a teacher of music at the Ottawa Teachers' College. Donor: The late F. Luella Barrigar. Endowed 1981.

Nurse "Bill" Bayley Memorial Fund

The fund is to provide for assistance in emergencies for students requiring dental and medical care. Endowed in 1974 by friends and students, this award is named in honour of the late Kathleen Bayley, a member of the Counselling and Health Services from 1965 to the time of her death June 7, 1973.

R.A. Beamish Bursary

Awarded annually to a student entering or progressing from one year to another who, without financial assistance, could not continue his or her formal education. To be eligible, an applicant must be a resident of one of the 11 eastern counties of Ontario (Renfrew, Frontenac, Lanark, Leeds, Carleton, Grenville, Russell, Dundas, Prescott, Glengarry, Stormont). Donor: The R.A. Beamish Foundation. Endowed 1951.

Afza Begum Bursary in Physics

Awarded twice annually (Fall term and Winter term) to a deserving student or students, in any year of Major or Honours studies in the Department of Physics, who is in need of financial assistance. Donor: Dr. Afza Begum. Established 1985.

Euphemia Bell Bursary Fund

To provide bursaries to deserving students in financial need. The fund has been made possible by a bequest of the late Euphemia Bell. Endowed 1978.

Beta Sigma Phi Sorority Bursary

Value \$800. Awarded to a deserving full-time student or students in good standing requiring financial assistance to complete his or her studies. Preference will be given to a member of Beta Sigma Phi in good standing or the son or daughter of same. Donor: The City Council of Beta Sigma Phi Sorority. Established 1964. Revised 1981, 1985.

J.P. Bickell Foundation Bursary Fund

The Trustees of the J.P. Bickell Foundation have established bursaries in the Faculty of Science. An applicant must be taking a normal sequence of courses leading to a degree in Geology and must have competent academic standing. Carleton students may obtain full details of the bursary from the Awards Office. Donor: J.P. Bickell Foundation, Toronto. Established 1956.

Birks Family Foundation Bursaries

The Birks Family Foundation has established a plan of annual contributions to the student aid fund of recognized Canadian universities and colleges for the creation of the Birks Family Foundation Bursaries. The bursaries are awarded by the foundation on the recommendation of the University Scholarship Committee and are not restricted to faculty or year and may be renewed. The number and amount of such awards may vary annually, depending upon the funds available for the purpose from the Foundation.

Gretta Boyd Memorial Bursary

Value \$150. First awarded in 1969-70 to an undergraduate student in any year or faculty with good academic standing and in need of financial assistance. Donor: Kiwanis Club of Nepean. Established 1969 in memory of the late Gretta Boyd. Revised 1985.

Nathan Braham Bursary

Awarded annually to an entering or returning student with superior academic standing who is in need of financial assistance. The bursary has been made possible by a bequest of Mr. Nathan Braham. Endowed 1964.

Donald William Buchanan Bursary

Awarded annually to a student entering or progressing from one year to another and who is in need of and deserving of assistance to continue studies as a full-time student. Donor: The late Donald William Buchanan. Endowed 1967.

Canadian Club of Ottawa Bursary

Value \$400. Awarded annually to student(s) in need of financial assistance. The object of the Canadian Club is to foster interest in and knowledge of Canada and Canadian affairs. Donor: Canadian Club of Ottawa. Established 1981. Revised 1985.

Carleton University Academic Staff Association Bursaries

Four bursaries valued at \$300 each. Awarded annually to full-time students proceeding from one year of program to another and requiring financial assistance. Donor: Carleton University Academic Staff Association. Established 1977.

C.U.A.S.A. Business Agent's Bursary

Awarded annually to a full-time student who is proceeding from one year of program to another, and is in need of financial assistance in order to continue his or her studies at Carleton. Endowed in 1988 by Patricia Ann Finn.

Carleton University Department of Security Services Bursary

To be awarded annually to a deserving student who has officially declared a concentration in Criminology and Criminal Justice and who is in need of financial assistance. Donor: Carleton University Department of Security Services. Established 1983.

Carleton University Faculty Wives Association Bursary

Awarded to students in good academic standing and in financial need. Donor: Carleton University Faculty Wives Association. Established 1977. Endowed 1979. Revised 1988.

Carleton University Refugee Student Bursary

Value \$3,000. Awarded annually on the recommendation of the World University Service of Canada to a refugee student entering or continuing his or her program at Carleton University, who is in need of financial assistance.

Desmond Geoffrey Carty Bursary

Awarded annually to a student in course, specifically in Engineering, who would not otherwise be able to proceed without delay to a higher year within the University. Donor: Mrs. E.G. Carty, in memory of her son, Desmond Geoffrey Carty. Endowed 1983.

Edward Godfrey Carty Bursary

Awarded annually to a student in course, specifically in Engineering, who would not otherwise be able to proceed without delay to a higher year within the University. Donor: Mrs. E.G. Carty, in memory of her husband, Edward Godfrey Carty. Endowed 1964.

Maurice Frederick Carty Bursary

Awarded annually to a student in course who would not otherwise be able to proceed without delay to a higher year within the University. Donor: Mrs. E.G. Carty, in memory of her son, Maurice Frederick Carty. Endowed 1957.

The Fred Cinkant Bursaries in Engineering

Awarded annually to Canadian citizen students entering or proceeding from one year of program to another in the Faculty of Engineering, who are in need and deserving of financial assistance to continue their studies at Carleton. Donor: Fred Cinkant, in memory of his mother and father, Mr. and Mrs. Antal Cinkant. Endowed 1984.

The Lorraine Cinkant Bursaries in Science

Awarded annually to Canadian citizen students entering or proceeding from one year of program to another in the Faculty of Science, who are in need and deserving of financial assistance to continue their studies at Carleton. Donor: Lorraine Cinkant, in memory of her mother and father, Mr. and Mrs. Edmond Sabourin. Endowed 1984.

Corporation House Limited Bursary

To be awarded annually to a good student in need of financial assistance who is, in addition, a son or daughter of a parent employed in the public service of Canada, or in a federal corporation or agency, or serving in the Armed Forces of Canada. Donor: Corporation House Limited. Established 1962.

Disabled Student Bursary Fund

The fund is to provide for disabled students in need of financial assistance. Donor: Joy MacLaren. Endowed 1988.

Engineers' Wives Association Bursary

Awarded annually to deserving students enrolled in the Faculty of Engineering. Donor: Engineers' Wives Association of Ottawa. Established 1959. Revised 1987.

Lillian Fallis Bursary

Value \$500. Awarded annually to a deserving student(s) proceeding from one year of program to another in the School of Business at Carleton University and who is in need of financial assistance. Donors: The family of the late Duncan H. MacLaren, a graduate of the School of Business. Endowed in 1980 in honour of Mrs. Lil Fallis, a longtime member of staff in the school, in recognition of her special interest in and support of students.

C.A. Fitzsimmons and Company Limited Bursary

Value \$300. Awarded annually to a competent student entering Carleton University who, without financial assistance, could not continue his or her formal education. Donor: C.A. Fitzsimmons and Company Limited, Ottawa. Established 1960.

Friends of Carleton Bursary Fund

A sum to provide bursaries for deserving students in need of financial assistance. This fund has been made possible by contributions from the Friends of Carleton University. Established 1967.

Mary C. Grant Bursary (Laurentian Chapter, I.O.D.E.)

Value \$1,125. Awarded annually to not more than three students who require financial assistance. The bursary was endowed in honour of Mary C. Grant. Donor: The Laurentian Chapter, I.O.D.E. Established 1962. Revised 1980.

John Lyndhurst Kingston Bursary Fund

The fund is to provide assistance to needy students in the study of architecture. This fund has been made possible by a bequest of the late Leslie Chandler Kingston. Endowed 1986

Knights of Pythias, Aurora Lodge No. 53 Bursary

Value \$100. Awarded to a good student progressing from one year of program to another who needs financial assistance

to continue his or her studies. Donor: Knights of Pythias, Aurora Lodge No. 53. Established 1960.

Patricia Larmonth Memorial Bursary

Value \$300. Awarded on the basis of reasonable competence, need and personal qualifications to a Canadian citizen who is a full-time student. Donor: Ottawa Women's Canadian Club. Established 1971. Revised 1983.

Jean A. Loates Bursary

Awarded annually to a deserving student entering Carleton University or proceeding from one year of program to another and requiring financial assistance to complete his or her studies. Donated by friends and colleagues of Jean Loates to mark her retirement in 1977. Mrs. Loates is a Carleton graduate and had a 26-year career at the University, first as Student Personnel Officer and from 1966 as Awards Officer. Endowed 1977.

Gordon Marshall and Jean Trudeau-Marshall Bursary

Value \$300. Awarded annually to a deserving student from the Regional Municipality of Ottawa-Carleton, who is enrolled at Carleton University and in need of financial assistance in order to continue his or her studies. Donor: Mr. Kenneth D. Simmons, in honour of his close friends, Gordon and Jean Marshall. Established 1985.

Ontario Industrial Roofing Contractors Association Bursary

Value \$500. Awarded annually to a student or students enrolled in Architecture, of good academic standing, who require(s) financial assistance. Donor: Ontario Industrial Roofing Contractors Association. Established 1980.

Ottawa Citizens' War Services Committee Bursary

An annual sum of approximately \$300 is available to assist veterans, their dependents or descendants, who are students in good standing at Carleton University and are in need of financial assistance. Endowed 1948.

Ottawa Superfluity Shop Bursaries

An annual sum of approximately \$1,500 is available to provide bursaries for veterans of World War I or World War II, or for the descendants of such veterans, who are students in good standing at Carleton University and in need of financial assistance. Endowed 1947.

Phillips Bursary

The annual yield of a fund of \$5,000 made available to Carleton University by Miss L.A. Phillips. The bursary is to be awarded each year to a student with good academic standing who is in need of financial assistance. Endowed 1962.

James H. Rattray Bursary Fund

To provide bursaries for students in Science and Engineering, with certain areas of preference. Donor: The late James H. Rattray, M.C. Endowed 1961.

Royal Canadian Legion Branch 16 Bursaries

Value \$500 each. Awarded annually to deserving students from the Regional Municipality of Ottawa-Carleton enrolled at Carleton University, who are in need of financial assistance. Donor: Royal Canadian Legion, Ottawa Branch 16. Established 1983.

J. Lansing Rudd Bursary

Awarded annually to a good student progressing from one year of program to another who needs financial assistance to continue his or her studies. Donor: The late J. Lansing Rudd. Endowed 1967.

Abraham and Mary Shaffer Bursary

Awarded annually to a good student entering Carleton University or proceeding from one year of program to another and requiring financial assistance to complete his or her studies. Donor: The late Abraham Shaffer. Endowed 1967.

William Ernest Simmons Bursary

Value \$300. To be awarded annually to a deserving student who has officially declared a concentration in Criminology and Criminal Justice and who is in need of financial assistance. Donor: Mr. Kenneth D. Simmons. Established 1983 in memory of the late William Ernest Simmons.

Sprott Charitable Foundation Bursary

Awarded annually to deserving undergraduate students in the Second, Third or Fourth years in the School of Business who require assistance to complete their program. Donor: Sprott Charitable Foundation. Established 1989.

Z. Matthew Stankiewicz Bursary

Awarded annually to a deserving student requiring financial assistance, who is entering or is enrolled in the School of Architecture at Carleton University. Donors: Friends, relatives and associates of the late Z. Matthew Stankiewicz. Endowed 1980.

Ormond M. Stitt Bursary Fund

To provide bursaries for deserving students in need of financial assistance. The fund has been made possible by a bequest of the late Miss Edith May Stitt, in memory of her brother, Ormond M. Stitt. Endowed 1966.

Isabella Ellen Taylor Memorial Bursary Fund

To provide bursaries to undergraduates in any year of program who are in need of financial assistance and have good academic standing. Donor: The late Daisy Elizabeth Taylor. Endowed 1969.

C.R. Thompson Bursary

Value to be announced. Awarded annually to a deserving student proceeding from one year of program to another in the Faculty of Engineering who is in need of financial assistance. Endowed in 1980 in honour of C.R. Thompson, Associate Dean of Engineering in recognition of his contributions to the Faculty of Engineering and its students.

3M Canada Inc. Bursary

Value \$500. Awarded annually to a good student or students in Commerce or Science, who requires financial aid. Donor: 3M Canada Inc. Established 1981.

Hubert Travers Bursary

Awarded annually to students in financial need who are entering or proceeding from one year to another of a full-time undergraduate program at Carleton University. Preference shall be given to students from the Ottawa area. Endowed 1983.

Trivial Pursuit Bursary

Awarded annually to deserving students in the Second, Third or Fourth year of the Journalism program who require assistance to complete their studies. Endowed in 1988 by the shareholders of Horn Abbot Ltd. in recognition of the perseverance, generosity and success of the creators of Trivial Pursuit and the Directors of Horn Abbot Ltd.

University General Bursary Fund

The fund is to provide bursaries in aid of students with satisfactory academic standing who, in the First or subsequent program years, are in need of financial assistance. Established by the University in 1954.

Wainwright Bursary

Awarded annually to a student or students studying Canadian history. Donor: Miss Dora I.I.S. Wainwright. Endowed 1974. Revised 1980.

Honourable Cairine Wilson Bursary

Awarded annually to a good student entering Carleton University or proceeding from one year of program to another and requiring financial assistance to complete his or her studies. The bursary has been made possible by a bequest of The Honourable Cairine Wilson, first woman member of the Canadian Senate. Endowed 1962.

Publication Grant

The John Porter Publication Grant

This grant, established in 1979 by friends and colleagues of the late John Porter, is open to authors of book-length works. The authors must be members of the Carleton University community whose manuscripts have been accepted by a reputable publisher, or persons not affiliated with Carleton University whose manuscripts have been accepted for publication in the Carleton Library series. An annual award of \$1,000, to be applied against the costs of publication of the work, will be determined by a Grants Committee appointed by the Vice President (Academic). Applications or nominations having been received by the committee, the recipient will be selected by the committee on the basis of overall merit and contribution to the literature dealing in aspects of Canadian society. The committee may decline to make an award in a given year for lack of meritorious candidates. The recipient will be expected to deliver a University public lecture dealing in the topic of the book at or near the time of publication.

Loan Funds

John Parker Loan Fund

To provide loans not exceeding \$1,500 each to students who have completed at least one successful year at Carleton University and who are not eligible to receive assistance from other sources of financial aid. This fund also provides emergency loans for 60 days or less to students whose funds from other sources have been delayed. Application forms are available to students in the Awards Office.

Government Aid programs:

See Student Services p. 16.

Further information regarding existing sources of scholarships, awards, bursaries and loans may be had from the Awards Office, telephone 788-3600.

Chancellor

Pauline Jewett, B.A., M.A., Ph.D., LL.D.

President and Vice-Chancellor

Robin H. Farquhar, B.A., M.A., Ph.D., F.C.C.E.A.

Board of Governors

Chairman

Donald R. Yeomans, B.A.Sc., C.M.A., F.S.M.A.C., P. Eng.

Vice-Chairman

Samuel F. Hughes

Ex-Officio Members

The Chancellor

The President and Vice-Chancellor

Elected Members

Retire June 30, 1990

Mark F. Barker

Clayton E. Beattie, CMM, C St.J, CD, B.A.

Leslie A. Copley, B.Sc., M.Sc., Ph.D.

Claude Edwards, O.C.

Bernie Etzinger

John L. Fryer, B.Sc., M.A.

Margaret Labarge, C.M., B.A., B. Litt., D. Litt.

Joy Maclaren, B.Sc.

Denise Moncion, B.A., M.S.W.

David W. Scott, Q.C., B.A., LL.B.

Frank Warnock

Retire June 30, 1991

Ross Cruikshank, B.A.Sc., P.Eng.

Nicole Deschênes, B.J.

A.J. Freiman, B.A.

William Joe

John Richard, Q.C., B.A., LL.B.

Elizabeth Waddell, B.P.H.E. (Hons)

James Watson, B.A.

Donald Yeomans, B.A.Sc., C.M.A., F.S.M.A.C., P.Eng.

Retire June 30, 1992

Thomas d'Aquino, B.A., LL.B., LL.M.

Judith M. Bell, B.A., LL.B.

Ivan Fellegi, M.Sc., Ph.D.

David R. Gardner, B.Sc., Ph.D.

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Professor of Music, and Sociology and Anthropology
- Ronald A. Shigeishi, B.Sc. (Toronto) Ph.D. (Queen's)
Associate Professor of Chemistry
- John H. Sigler, A.B. (Dartmouth) M.A. (Georgetown) Ph.D. (Southern California)
Professor of Political Science and International Affairs
- J. Sinclair, B.Sc., Dip. in Biophysics (Edinburgh) Ph.D. (East Anglia)
Associate Professor of Biology

- Randy R. Sitter, B.Sc., M.Sc. (British Columbia) Ph.D. (Waterloo)
Assistant Professor of Mathematics and Statistics
- S.A. Sjolander, B.Eng., M.Eng. (Carleton) Ph.D. (Cambridge)
Associate Professor of Engineering
- George B. Skippen, M.Sc. (McMaster) Ph.D. (Johns Hopkins)
Professor of Earth Sciences
- Patricia Smart, B.A. (Toronto) M.A. (Laval) Ph.D. (Queen's)
Professor of French
- Arthur Smith, B.A. (Oxford) Ph.D. (Manchester)
Associate Professor of Mathematics
- Derek G. Smith, B.A. (British Columbia) M.A., Ph.D. (Harvard)
Associate Professor of Sociology and Anthropology
- Donald Alan Smith, M.A., Ph.D. (Toronto)
Associate Professor of Biology
Curator of the Museum of Zoology
- Donald W. Smith, B.A. (York) M. ès L. (Paris) Ph.D. (Ottawa)
Professor of French
- Douglas A. Smith, B.Com., M.A. (Toronto) Ph.D. (Massachusetts Institute of Technology)
Associate Professor of Economics
- Michael W. Smith, B.Sc. (Liverpool) M.A. (Georgia) Ph.D. (British Columbia)
Associate Professor of Geography
- Miriam Smith, B.A. (McGill) M.A., M.Phil. (Yale)
Lecturer in Political Science
- Tom J. Smy, B.Sc. (Alberta)
Assistant Professor of Electronics
- Nicholas P. Spanos, A.B. (Boston) M.A. (Northeastern) Ph.D. (Boston)
Professor of Psychology
- Daiva K. Stasiulis, B.A., M.A. (California at San Diego) Ph.D. (Toronto)
Associate Professor of Sociology
- James Steele, M.A. (Toronto) Ph.D. (London)
Associate Professor of English
- Allan D. Steeves, M.S.A. (Toronto) Ph.D. (Michigan)
Associate Professor of Sociology and Anthropology
- Caryll Steffens, B.A., M.A. (Maryland) Ph.D. (North Carolina)
Assistant Professor of Sociology
- K.B. Storey, B.Sc. (Calgary) Ph.D. (British Columbia)
Professor of Biology, Chemistry and Biochemistry
- W.O. Straw, B.A. (Carleton) M.A. (McGill)
Assistant Professor of Film Studies
- P.V. Straznicky, Dipl.Ing. (Brno) M.Eng. (Toronto)
Professor of Engineering
- Lloyd H. Strickland, A.B. (Johns Hopkins) Ph.D. (North Carolina)
Professor of Psychology
- John W. Strong, B.A. (Colby) M.A. (Boston) Ph.D. (Harvard)
Professor of History
- V. Subramaniam, B.Sc., M.A. (Madras) Ph.D. (Australian National)
Professor of Political Science
- William A. Sullivan, B. Eng. (Lakehead)
Instructor in Engineering
- M.K. Sundareshan, M.Sc. (Delhi) Ph.D. (Cornell)
Professor of Physics
- G.T. Suter, B.Eng.Sc. (Western Ontario) M.A.Sc., Ph.D. (Toronto) P.Eng.
Professor of Engineering
- Sharon Sutherland, B.A., M.A. (Alberta) Ph.D. (Essex)
Professor of Public Administration
- Gilbert F. Sutton, B.Arch. (Toronto) M.R.A.I.C.
Associate Professor of Architecture
- Peter Swan, B.A., LL.B. (Dalhousie) M.E.S. (York) LL.M. (Osgoode Hall)
Assistant Professor of Law
- Donald G. Swartz, B.A., M.S., Ph.D. (Cornell)
Associate Professor of Public Administration
- Eugene Swimmer, B.A. (City College of New York) M.A. (Chicago) Ph.D. (Cornell)
Professor of Public Administration
- B.A. Syrett, B.Eng., M.Eng. (Carleton) Ph.D. (Alberta) P.Eng.
Professor of Engineering
- Franz A.J. Szabo, B.A. (Montréal) M.A., Ph.D. (Alberta)
Associate Professor of History
- R. Stephen Talmage, M.A. (Oxford)
Associate Professor of Philosophy
- C.L. Tan, B.Sc., Ph.D. (London)
Associate Professor of Engineering
- Brian W. Tansley, B.A., M.A. (British Columbia) M.A., Ph.D. (Rochester)
Associate Professor of Psychology
- N. Garry Tarr, B.Sc., Ph.D. (British Columbia)
Associate Professor of Engineering
- D.R.F. Taylor, M.A. (Edinburgh) P.G.C.E. (London) Ph.D. (Edinburgh)
Professor of Geography and International Affairs
- J.H. Taylor, B.Sc. (Alberta) M.A. (British Columbia)
Associate Professor of History
- Richard P. Taylor, B.Sc., Ph.D. (Leicester)
Associate Professor of Earth Sciences
- E.L. Tepper, B.A. (Michigan) M.A. (American) Ph.D. (Duke)
Associate Professor of Political Science

D.A. Thomas, B.Eng., M.Eng. (Carleton)
Associate Professor of Computer Science

David R. Thomas, B.Sc., Ph.D. (Imperial College) M.Sc. (Carleton)
Associate Professor of Business

James M. Thompson, M.A. (Toronto)
Associate Professor of Philosophy

Michael B. Thompson, B.A., M.A. (Oxford)
Associate Professor of English

Warren B. Thorngate, B.A. (California) M.A., Ph.D. (British Columbia)
Professor of Psychology

Alistair Tilson, M.A. (St. Andrews) B.Litt. (Oxford)
Associate Professor of English

A. Trevor Tolley, B.A. (Oxford)
Professor of English

Jo Wood Tombaugh, B.A. (DePauw) M.A., Ph.D. (Missouri)
Professor of Psychology

T.N. Tombaugh, B.A. (DePauw) M.A., Ph.D. (Missouri)
Professor of Psychology

Brian W. Tomlin, B.A. (McMaster) M.A., Ph.D. (York)
Professor of Political Science

Glen Toner, B.A. (Saskatchewan) M.A. (Alberta) Ph.D. (Carleton)
Associate Professor of Political Science

James K. Torrance, B.S.A. (Guelph) M.S., Ph.D. (Cornell)
Professor of Geography

Chishium S. Tsai, B.Sc. (Taiwan) M.Sc., Ph.D. (Purdue)
Professor of Chemistry and Biochemistry

J.E. Tunbridge, B.A., M.A. (Cambridge) Ph.D. (Bristol)
Associate Professor of Geography

William M. Tupper, M.Sc. (New Brunswick) Ph.D. (Massachusetts Institute of Technology)
Professor of Earth Sciences

Victor F. Valentine, M.A. (Toronto)
Professor of Sociology and Anthropology

P.D. van der Puije, B.Sc. (Eng.) (Kumasi) D.I.C. (Imperial) Ph.D. (London)
Associate Professor of Engineering

David Van Praagh, B.A. (Brandeis) M.S. (Columbia)
Associate Professor of Journalism

Pierre van Rutten, Ph.D. (Ottawa) Dip. langue et lit. française (Sorbonne) Docteur en philosophie et lettres (Belgium)
Professor of French

J.J. van Vlasselaer, Cert. Paed. (Antwerp) M.A. (Ottawa)
Associate Professor of French

Paul Varnai, M.A. (Montréal) Ph.D. (Michigan)
Associate Professor of Russian

Jill McCalla Vickers, B.A. (Carleton) Ph.D. (London)
Professor of Political Science and Canadian Studies

P. John Vierula, B.Sc. (York) Ph.D. (Calgary)
Assistant Professor of Biology

E. Voldeng, B.A., M.A., D. de 3e cycle (Aix-en-Provence)
Associate Professor of French

Harald von Riekhoff, B.A. (Western Ontario) M.A., Ph.D. (Yale)
Professor of Political Science

Gillian Walker, B.A., M.S.W. (British Columbia) Ph.D. (Toronto)
Associate Professor of Social Work

David J. Walkey, B.Sc., Ph.D. (Calgary)
Assistant Professor of Engineering

A.I. Wallace, B.A., Ph.D. (Oxford)
Associate Professor of Geography

W.E. Walther, B.A. (Chico State) M.Sc. (San Diego) Ph.D. (Iowa)
Associate Professor of Psychology

Bernard Wand, B.A. (Queen's) M.A., Ph.D. (Cornell)
Professor of Philosophy

George Warskett, B.Sc. (London) M.Sc., Ph.D. (Queen's)
Associate Professor of Public Administration

D.H. Watkinson, B.Sc., M.Sc. (McMaster) Ph.D. (Pennsylvania State)
Professor of Earth Sciences

Marion J. Watson, M.Sc. (Queen's)
Assistant Professor of Mathematics

P.J.S. Watson, B.Sc. (Edinburgh) Ph.D. (Durham)
Professor of Physics

James B. Waugh, B.Com. (Toronto) M.B.A. (California) C.A.
Associate Professor of Business

Dorothea Wayand, M.A., Dr. Jur. (Vienna)
Associate Professor of Law

P.J. Weatherhead, B.Sc. (Carleton) M.Sc., Ph.D. (Queen's)
Professor of Biology

John A. Webb, B.Sc., Ph.D. (London) F.R.E.S.
Professor of Biology

W.L. Weber, B.Sc. (Saskatchewan) M.B.A. (Western Ontario) M.S. (Carnegie Institute of Technology) Ph.D. (Carnegie-Mellon)
Associate Professor of Business

William G. Webster, B.Sc. (McGill) M.A. (Cornell) Ph.D. (Pennsylvania State)
Professor of Psychology

Lorna Weir, B.A. (McGill) M.A., Ph.D. (York)
Assistant Professor of Sociology and Anthropology

Roger B. Wells, B.A. (Reed) M.A., Ph.D. (North Carolina)
Associate Professor of Psychology

Michael E. Welsh, B.A. (Rhodes, Cape Town) Ph.D. (London)
Associate Professor of Classics

Edwin G. West, M.Sc. Ph.D. (London)
Professor of Economics

Anthony Westell
Professor of Journalism

John R. Weston, B.S.A. (Toronto) Ph.D. (Michigan)
Associate Professor of Journalism

Donald Westwood, Dip.Arch. (The Polytechnic) R.I.B.A.
Associate Professor of Architecture

M.S. Whittington, M.A. (Carleton)
Professor of Political Science

Donald Whyte, B.Sc. (Manitoba) M.Sc., Ph.D. (Cornell)
Professor of Sociology and Anthropology

Donald C. Wigfield, B.Sc., D.Sc. (Birmingham) Ph.D. (Toronto)
Professor of Chemistry

J.S. Wight, B.Sc. (Calgary) M.Eng., Ph.D. (Carleton) P.Eng.
Professor of Engineering

R.H. Wightman, B.Sc., Ph.D. (New Brunswick)
Associate Professor of Chemistry

James M. Wilcox, B.S., M.A. (Michigan) Ph.D. (Wayne State)
Associate Professor of English

Thomas P. Wilkinson, B.Sc. (Durham) Ph.D. (Newcastle-upon-Tyne)
Associate Professor of Geography

Glen Williams, B.A., M.A., Ph.D. (York)
Associate Professor of Political Science

Kenneth Stuart Williams, B.Sc. (Birmingham) M.A., Ph.D. (Toronto) D.Sc. (Birmingham)
Professor of Mathematics

Peter J. Williams, B.A., M.A. (Cambridge) Fil. Lic., Fil. Dr. (Stockholm)
Professor of Geography

S.G. Wilson, B.A., Ph.D. (Durham)
Professor of Religion

V. Seymour Wilson, B.Sc. (British Columbia) D.P.A., M.A. (Carleton) Ph.D. (Queen's)
Professor of Political Science

Stanley Lewis Winer, B.A. (Carleton) M.A., Ph.D. (Johns Hopkins)
Professor of Public Administration

Conrad J. Winn, B.A. (McGill) Ph.D. (Pennsylvania)
Professor of Political Science

Sydney F. Wise, C.M., B.A., B.L.S. (Toronto) M.A. (Queen's) LL.D. (Guelph) F.R.S.C.
Professor of History

Julian Wolfe, B.A. (Carleton)
Associate Professor of Philosophy

Jo-Yung Wong, B.Sc. (Tsing Hua) Ph.D., D.Sc. (Newcastle-upon-Tyne) F.I.Mech.E., F.A.S.M.E., P.Eng., C. Eng.
Professor of Engineering

Devon H. Woods, B.A. (Carleton) M.Sc. (Edinburgh)
Assistant Professor of Applied Language Studies

C.M. Woodside, B.A.Sc. (Toronto) Ph.D. (Cambridge) P.Eng.
Professor of Engineering

B.J. Wozniak, M.F.A. (Academy of Fine Arts, Warsaw)
Associate Professor of Industrial Design

J. Barry Wright, B.A. (Toronto) LL.B., D.Jur. (Osgoode Hall) LL.M. (London School of Economics)
Assistant Professor of Law

James S. Wright, B.S. (Stanford) Ph.D. (California at Berkeley)
Professor of Chemistry

D.J. Wurtele, B.A. (London) M.A., Ph.D. (McGill)
Professor of English

R.C. Wyndham, B.Sc. (McMaster) M.Sc. (Guelph) Ph.D. (Calgary)
Associate Professor of Biology

Janice M. Yalden, B.A. (Toronto) M.A. (Michigan)
Professor of Linguistics and Applied Language Studies

H. Yamazaki, M.S. (Hokkaido) Ph.D. (Wisconsin)
Professor of Biology and Biochemistry

Raymond W. Yole, B.Sc. (New Brunswick) M.A. (Johns Hopkins) Ph.D. (British Columbia)
Professor of Earth Sciences

Lynne Young, B.A. (Carleton) Ph.D. (Louvain)
Instructor in Applied Language Studies

Robert M. Zacharko, B.Sc. (Montréal) M.Sc., Ph.D. (Saskatchewan)
Associate Professor of Psychology

Graham Zelmer, B.Sc. (Manitoba) Ph.D. (British Columbia)
Associate Professor of Mathematics

Donald W. Zimmerman, A.B. (Indiana) M.A., Ph.D. (Illinois)
Professor of Psychology

Eugenia N. Zimmerman, B.A. (Barnard) M.A., Ph.D. (Wisconsin)
Associate Professor of French

Helmut Zobl, B.A., M.A. (Toronto) Ph.D. (Essen)
Associate Professor of Linguistics

Professors Emeriti

Alexander Munro Beattie, B.A. (Toronto) A.M., Ph.D. (Columbia) D. Litt. (Carleton)
English

D.J. Cahill, O.M.I., B.A. (Ottawa)
Physics

Patrick Cruttwell, B.A., M.A. (Cambridge)
English

David M.L. Farr, B.A. (British Columbia) M.A. (Toronto)
D.Phil. (Oxford)
History

George B. Johnston, B.A., M.A. (Toronto) LL.D. (Queen's)
D.Litt. (Carleton)
English

Wilfred H. Kesterton, B.A. (Queen's) B.J., D.Litt. (Carleton)
Journalism

Moray St. John Macphail, B.A. (Queen's) M.A. (McGill)
D.Phil. (Oxford) D.Sc. (Carleton) F.R.S.C.
Mathematics

H.B. Mayo, B.A. (Dalhousie) M.A., D.Phil. (Oxford) LL.D.
(Carleton) F.R.S.C.
Political Science

R.L. McDougall, B.A. (British Columbia) M.A., Ph.D.
(Toronto)
English

Herbert H.J. Nesbitt, B.A. (Queen's) M.A., Ph.D. (Toronto)
D.Sc. (Leiden, Carleton) F.L.S., F.R.E.S., F.Z.S.
Biology

F.K. North, M.A., D.Phil. (Oxford)
Geology

Ernst M. Oppenheimer, B.A. (Toronto) M.A. (Columbia)
Ph.D. (Harvard)
German

George Swinton, B.A. (McGill)
Art History

M.J. Sydenham, B.A., Ph.D. (London) F.R.Hist.S.
History

F.G. Vallee, B.A. (McGill) Ph.D. (London)
Sociology and Anthropology

The Institution

1942

Ottawa Association for the Advancement of Learning established to develop Carleton College. At first the College offered only evening classes in introductory university subjects, with some courses in public administration.

1943

Ottawa Association for the Advancement of Learning Incorporated.

1945

Beginning of day classes and full-time teaching. Establishment of the Faculty of Arts and Science, including courses in journalism, and first-year engineering.

1946

Move from rented premises to the First Avenue campus, formerly Ottawa Ladies' College. First degrees awarded, three in journalism and three in public administration.

1947

The College committed itself to complete Major and Honours courses, the third year of the program being offered for the first time in 1947-48, the fourth year in 1948-49, and the fifth (Honours) year in 1949-50.

1949

First degrees in arts, science and commerce awarded. Formation of Senate.

1950

First Honours degrees in arts and science awarded.

1952

The Carleton College Act 1952 passed by the Ontario Legislature. This changed the corporate name to Carleton College. It also confirmed the power to grant degrees.

1952-53

Property for new campus acquired, on the site between the Rideau River and the Rideau Canal.

1953

Establishment of the School of Public Administration.

1954

Appointment of Architectural Associates for Carleton to prepare first master plan and to design first group of buildings. First honorary degree of LL.D. conferred on Dag Hammarskjöld, Secretary-General of the United Nations.

1955

First Master's degree awarded.

1957

The Carleton University Act, 1957. Establishment of the School of Engineering. Establishment of the Institute of Canadian Studies.

1959

Move to Rideau River campus, following construction of the Henry Marshall Tory Building (science), the Maxwell Macdorm Library, and Norman Paterson Hall (arts).

1961

First degrees in engineering awarded. First Ph.D. degree awarded.

1962

Students accommodated in residences on campus for the first time.

1963

Reorganization into Faculties of Arts, Engineering,

Science, and Graduate Studies. Committee on Soviet and East European Studies established.

1966

Establishment of the School of International Affairs. Establishment of the School of Commerce. Comparative Literature Committee established.

1967

Integration of St. Patrick's College as a division of the Faculty of Arts. School of Social Work became part of the Faculty of Arts.

1968

Establishment of the School of Architecture. New University Government established with student representatives at all levels of the University system from department to Board of Governors. First academic exchange agreement between Carleton and the State University of Leningrad.

1969

Free choice first year initiated for the Faculty of Arts. Linguistics Committee established.

1970

Agreement completed between Carleton and the University of Ottawa to accept "visiting students" at the graduate level. Biochemistry degree program initiated. The Institute of Soviet and East European Studies established.

1971

Unified Liberal Arts Program established for St. Patrick's College. General Science Degree program established with Environmental Studies program available.

1972

School of Social Work is accommodated on the Rideau River campus. A one-year French program offered at St. Patrick's College for students wishing to improve their knowledge of the French language and culture by one year's intensive study. Exchange program with the Université de Savoie, Chambéry, France.

1973

First degrees in architecture awarded. St. Patrick's College moved to a new facility on the Rideau River campus. Establishment of the School of Industrial Design. New athletics complex, with a fifty-metre pool and a fitness centre opened.

1974

Faculty of Graduate Studies renamed Faculty of Graduate Studies and Research. School of International Affairs renamed The Norman Paterson School of International Affairs. First courses offered off campus in Lanark County and downtown Ottawa. St. Patrick's College division held first Convocation ceremony at new location on Rideau River campus. Master of Journalism program approved for September 1974. Master of Arts program in anthropology approved for September 1975. Master of Arts program in religion approved. Program leading to Certificate in Teaching of English as a Second Language established. Academic exchange agreement between Carleton and the International Cultural Institute, Budapest, Hungary.

1975

Lester B. Pearson Chair for International Affairs approved. Establishment of Gerhard Herzberg Lecture Series in Science. First students enrol in joint Master of Public Administration program, offered in conjunction with the University of Ottawa. Scholarships established for part-time students. CKCU-Radio Carleton has FM licence approved. New undergraduate programs introduced in Canadian studies and computing science. A program in film studies approved. First Dunton Alumni Award presented.

1976

Creation of The Paterson Centre for International Programs to co-ordinate the growing number of academic exchanges between Carleton and universities throughout the world. Division of the Faculty of Arts into two separate faculties; the Faculty of Arts and the Faculty of Social Sciences. First Master of Journalism degrees awarded.

1977

Criminology and Corrections concentration (later renamed Criminology and Criminal Justice) begun at St. Patrick's College, April.

1978

School of Continuing Education established. Credit courses offered on cable television, September. Institute of Biochemistry established.

1979

St. Patrick's College ceased to operate as an academic unit of the University. Academic programs of the College continue as University programs, except for the Unified Liberal Arts Program. Department of Film Studies established. First Marston LaFrance Memorial Lecture presented. Ph.D. program in English and French Canadian literature begun.

1980

Undergraduate School of Computer Science established.

1981

Establishment of the Ottawa-Carleton Institute for Research and Graduate Studies in Chemistry, a joint program with the University of Ottawa. Establishment of a joint Ph.D. program in economics with the University of Ottawa. Establishment of the B.Eng. Computer Systems Engineering Program.

1982

Establishment of the Ottawa-Carleton Centre for Geoscience Studies, representing the combined research strengths of Carleton University and the University of Ottawa with programs leading to M.Sc. and Ph.D. degrees in most areas of geology. Establishment of a joint master's program in computer science with the University of Ottawa. University celebrates 40th anniversary.

1983

Establishment of four joint graduate programs with the University of Ottawa: the Ottawa-Carleton Centre for Graduate Studies and Research in Biology; the Ottawa-Carleton Centre for Graduate Studies and Research in Physics; the Ottawa-Carleton Institute for Research and Graduate Studies in Electrical Engineering; and the Ottawa-Carleton Graduate Specialization in Neuroscience.

1984

Two new undergraduate programs were introduced: the Combined Honours B.Sc. in Biology and Biotechnology, and in Biochemistry and Biotechnology. Joint graduate programs with the University of Ottawa were established in the areas of civil engineering, mechanical and aeronautical engineering, and mathematics and statistics.

1985

Master of Management Studies program established in the School of Business. The School of Public Administration offers a concentration in development administration in conjunction with the Norman Paterson School of International Affairs. An additional floor on one wing of the Herzberg Laboratories for Physics is constructed to house the School of Computer Science.

1986

The Social Sciences Research Building is built to accommodate the rapidly-expanding research activity in the

Faculty of Social Sciences. An annex on the top floor of the Architecture Building is constructed to provide additional space for the Faculty of Engineering. The Paterson Centre for International Programs is renamed Carleton International with a broader mandate to administer Carleton's international activities in teaching and research.

1987

The Institute of Women's Studies is established. The Arts Tower is renamed Davidson Duntun Tower/Edifice Davidson Duntun in honour of Arnold Davidson Duntun, former Carleton University President and Director of the Institute of Canadian Studies. Major revisions to the Undergraduate Exchange Agreement with the University of Ottawa extend opportunities for students to study at both universities. The University launches the Carleton University Challenge Fund, the largest fund-raising campaign in its history.

1988

Canada's first Bachelor of Engineering programs in aerospace engineering is established. Bell Northern Research Limited and the Natural Sciences and Engineering Research Council provide funding for an Industrial Research Chair in computer-aided engineering within the Department of Electronics. The Departments of Electronics and Systems and Computer Engineering are major partners in the Telecommunications Research Institute of Ontario (TRIO), one of seven "centres of excellence" chosen by the provincial government for scientific research. The Faculty of Science introduces co-operative education programs in computer science and biochemistry/biotechnology.

1989

New regulations for the Faculties of Arts and Social Sciences encourage stricter controls on academic progress. Department of Mechanical and Aeronautical Engineering renamed Department of Mechanical and Aerospace Engineering. The Institute of Political Economy is established. The Canadian Centre for Trade Policy and Law, a joint initiative of the Norman Paterson School of International Affairs and the University of Ottawa, is established. Carleton University and Apple Canada Inc. form a partnership in the Apple Research Partnership Program. The Challenge Fund surpasses 80 percent of its goal by mid-year and capital projects are initiated: the new Life Sciences Building; a residence building; additions to the MacOdrum Library and Southam Hall; and the Minto Centre for Advanced Studies in Engineering.

Enrolment

In the fall of 1989, there were 14,000 full-time students registered at the University; students taking courses on a part-time basis numbered 5,500.

Presidents

1942-47

Henry Marshall Tory

1947-55

Murdoch Maxwell MacOdrum

1955-56

James Alexander Gibson (*Acting*)

1956-58

Claude Thomas Bissell

1958-72

Arnold Davidson Dunton

1972-78

Michael Oliver

1979

James Downey (*Pro tempore*)

January 1 — May 15

1979-1989

William Beckel

1989-

Robin H. Farquhar

Chancellors

1952-54

Harry Stevenson Southam

1954-68

Chalmers Jack Mackenzie

1969-72

Lester Bowles Pearson

1973-80

Gerhard Herzberg

1980-90

Gordon Robertson

1990-

Pauline Jewett

Special Lectures at Carleton University

477

The University sponsors a number of special lectures each year. These lectures are open to the public.

The Munro Beattie Lecture

Established in 1985 in honour of Alexander Munro Beattie, the founder and first Chairman of the Department of English, in recognition of his outstanding contribution to Carleton University in teaching, scholarship and administration. Sponsored by the Department of English Language and Literature.

The Florence Bird Lecture

Established in 1987 to explore the experiences of women in Canada and abroad. It is named in honour of The Honourable Florence Bird, in recognition of her work for the Canadian Broadcasting Corporation, the Canadian International Development Agency, the Royal Commission on the Status of Women in Canada, and the Senate. Sponsored jointly by the Faculties of Arts and Social Sciences.

The Davidson Dunton Research Lecture

Established in 1983, the Davidson Dunton Research Lecture is presented by a Carleton University scholar who is active in research and has achieved international recognition. The lecture is in honour of former Carleton University President Arnold Davidson Dunton.

The Gerhard Herzberg Lecture

Established in 1975 by the Faculty of Science, this lecture honours Gerhard Herzberg, former Chancellor of Carleton University and recipient of the 1971 Nobel Prize for Chemistry. The lecture emphasizes the relationship between science and society and addresses an aspect of science that has a pronounced impact on our daily lives.

The Marston LaFrance Research Fellowship Lecture

Established in 1979 by the Faculty of Arts in memory of Marston LaFrance, former Professor of English and Dean of Arts at Carleton University. Each year, the recipient presents a seminar or public lecture on some aspect of the research conducted while on fellowship.

The C.J. Mackenzie Lecture

Established in 1986 in memory of C.J. Mackenzie, former President of the National Research Council and the Atomic Energy Control Board, and the Chancellor of Carleton University from 1954 to 1968. The lecture is sponsored by the Faculty of Engineering.

The McMartin Memorial Lecture

The McMartin Memorial Lecture is presented in alternate years by the Department of Religion at Carleton University and the Faculty of Graduate Studies at the University of Ottawa. The series was established in 1969 and is funded by Mrs. J.P. Gilhooly of Ottawa in memory of her parents, Mr. and Mrs. John McMartin. Lecture themes promote the importance of ethical, moral and religious standards to education and living.

The Adam Mickiewicz Memorial Lecture

Established in 1969, the Adam Mickiewicz Memorial Lecture is presented each year by noted authorities in the area of Soviet and East European Studies. The series is sponsored by Carleton University's Institute of Soviet and East European Studies and the Adam Mickiewicz Foundation of Canada to commemorate Poland's foremost poet, Adam Mickiewicz.

The H.H.J. Nesbitt Lecture

Established in 1987 by the Faculty of Science in honour of H.H.J. Nesbitt, Carleton University's first Dean of Science. The lectures are presented by Carleton alumni who have earned international recognition as scientists. The topics

are of general interest to the public as well as to the scientific community.

The Pickering Lecture

Sponsored by the Department of Psychology at Carleton University and the Pickering Institute for Living in Ottawa, lecture topics focus on problems of developmental and childhood psychology. Established in 1975.

The Alan B. Plaunt Memorial Lecture

Established in 1957 through a gift from an anonymous donor in memory of Alan B. Plaunt, a distinguished Canadian who was active in many projects of national and civic importance in the 1930s. Each year, a Canadian who is involved in contemporary issues and committed to a distinctively Canadian quality of life is invited to speak on any aspect of Canadian life.

The John Porter Memorial Lecture

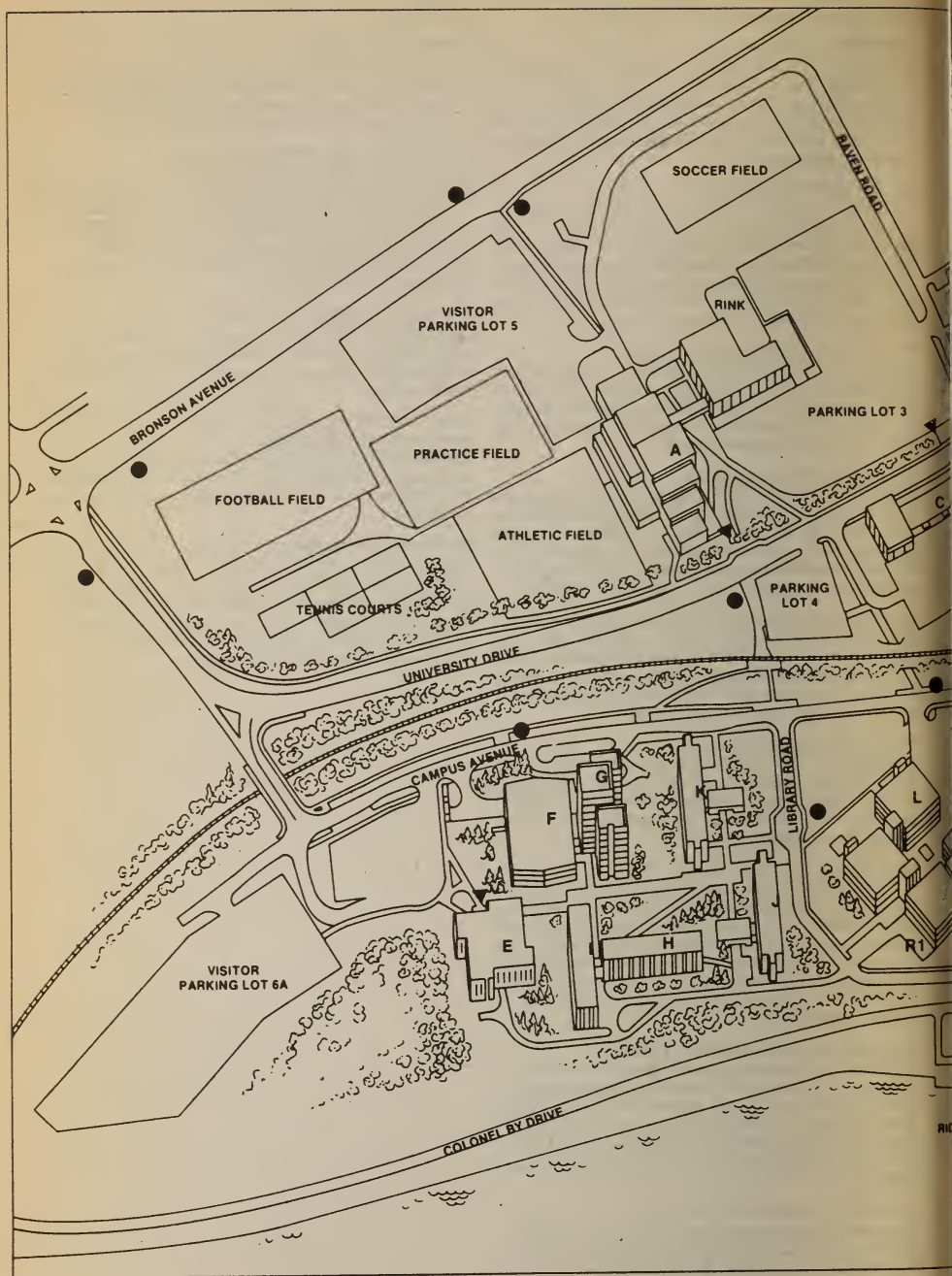
Established in 1982 in memory of John Porter, former Vice-President (Academic) at Carleton University and a distinguished sociologist. Sponsored by the Faculty of Social Sciences.

The Technology, Society, Environment Committee/Faculty of Arts Lecture

Established in 1981 by the Technology, Society and Environment Committee and the Faculty of Arts to sensitize the public to the impact of technology on society and the environment.

The Philip E. Uren Memorial Lecture

Established in 1982 in memory of Philip Uren, former Director of the Institute of Soviet and East European Studies, the Norman Paterson School of International Affairs, and the Paterson Centre for International Programs at Carleton University (now Carleton International). Sponsored by the Faculty of Social Sciences.



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| MB | C | Maintenance Building |
| AB | D | Administration Building |
| SP | E | St. Patrick's Building |
| CO | F | University Commons |
| GH | G | Glengarry House |
| GR | H | Grenville House |
| RU | I | Russell House |
| LH | J | Lanark House |
| RH | K | Renfrew House |
| ME | L | Mackenzie (Engineering) Building |
| AA | M | Architecture Building |
| UC | N | University Centre |
| TB | O | Tory (Science) Building |
| DT | P | Dunton Tower |
| ML | Q | MacOdrum Library |
| SA | R | Southam Hall |
| SA | S | Alumni Theatre |
| SR | T | Social Sciences Research Building |
| LA | U | Loeb Building |
| PA | V | Paterson Hall |
| HP | W | Herzberg Laboratories for Physics |
| SC | X | Steacie (Chemistry) Building |
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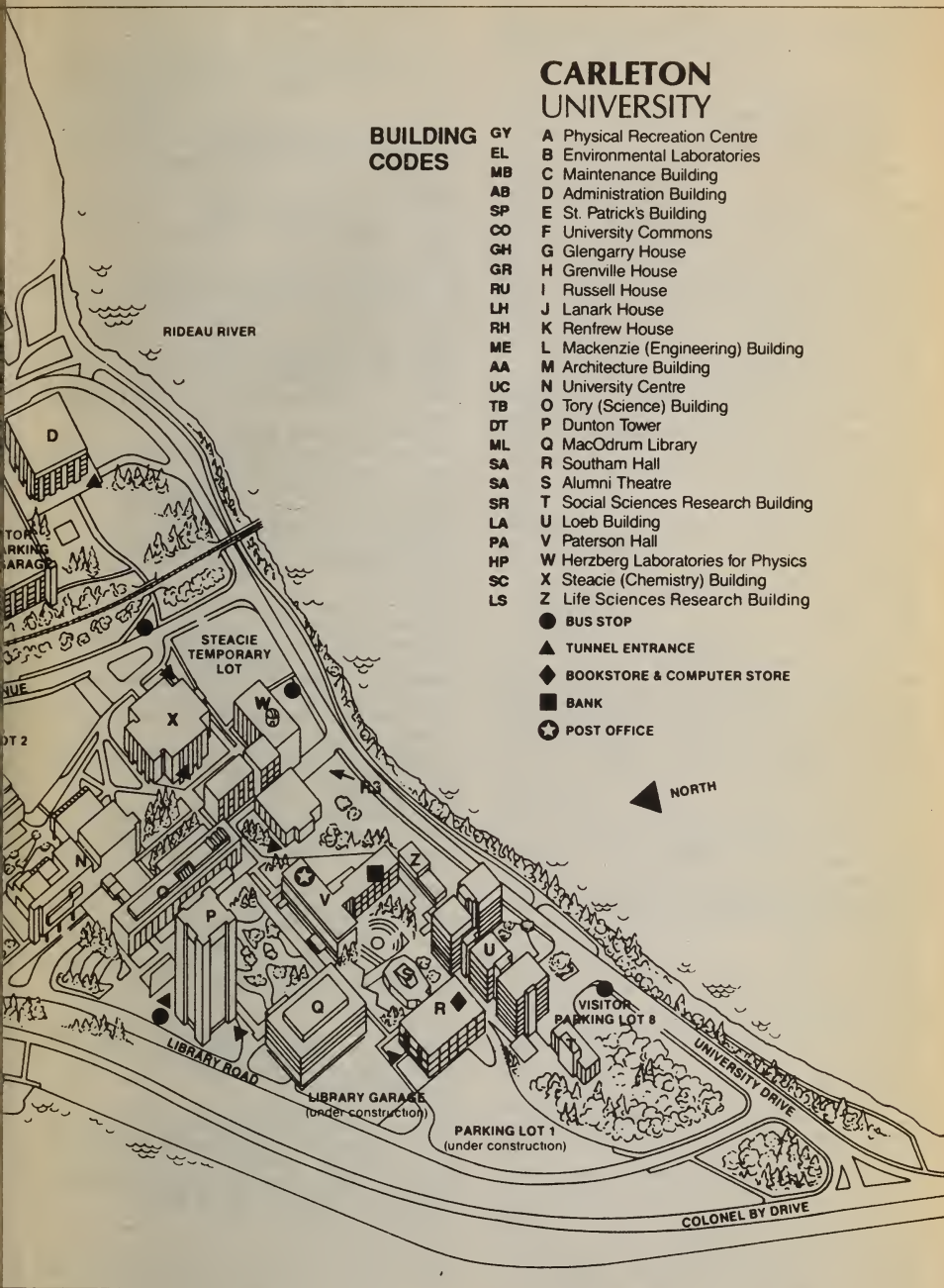
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